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# GLOBAL DATA MONITORING REPORT

May, 1998

**Data Assimilation**
**Meteorological Office**
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**RG12 2SZ**

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## 1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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## 2 Global Data Monitoring Statistics

### Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

### Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

## Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m $s^{-1}$ have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m $s^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

| Figure | Parameter |
|---|---|
| 4 | Mean wind vectors |
| 5 | Mean observation - background wind vector |
| 6 | Mean observation-background speed (m $s^{-1}$) |
| 7 | RMS observation-background vector (m $s^{-1}$) |

## Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

## Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

| Figure | Parameter Plotted | Layer (hPa) |
|---|---|---|
| 10 | Availability/average daily number | 701-1000 |
| 11 | Vector mean wind (observed) | 701-1000 |
| 12 | Observation-background vector wind difference | 701-1000 |
| 13 | Mean observation-background speed differences | 701-1000 |
| 14 | RMS observation-background vector difference | 701-1000 |
| 15 | Availability/average daily number | 401-700 |
| 16 | Vector mean wind (observed) | 401-700 |
| 17 | Observation-background vector wind difference | 401-700 |
| 18 | Mean observation-background speed differences | 401-700 |
| 19 | RMS observation-background vector difference | 401-700 |
| 20 | Availability/average daily number | 101-400 |
| 21 | Vector mean wind (observed) | 101-400 |
| 22 | Observation-background vector wind difference | 101-400 |
| 23 | Mean observation-background speed differences | 101-400 |
| 24 | RMS observation-background vector difference | 101-400 |

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-14. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

N.B. 500 km SATEMs are no longer assimilated into the UKMO global Unified Model. Both 500 km and 120 km SATEMs were replaced on 16th April 1996 by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS (from NOAA-11 and NOAA-14).

| Figure | Layer (hPa) |
|---|---|
| 25/28 | 850-1000 |
| 26/29 | 100-300 |
| 27/30 | 30-50 |

## 3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

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## Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
6. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
7. January 1998. Increase in resolution of UKMO global forecast model.
8. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.

## TABLE 1

## MONITORING OF MARINE SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for ships, fixed buoys and platforms.

**Standard of comparison** :Background field from Bracknell global model.

**Observation times** :00, 06, 12, 18 UTC

**Elements monitored**
:Mean sea level pressure (hPa).
:Wind speed (m $s^{-1}$).
:Wind direction (Degrees).

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. a positive bias indicates the observation is veered to the background.**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

**GROSS ERROR LIMIT**
:15 hPa (pressure)
:25 m $s^{-1}$ (vector wind)

**SELECTION CRITERIA** :NOBS ≥ 20 , and one or more of the following:

1.| bias| ≥ 4 hPa (pressure),
≥ 5 m $s^{-1}$ (wind speed),
≥ 30 degrees (direction).

2.SD ≥ 6 hPa (pressure),
≥ 80 degrees (direction).

3.PGE ≥ 25

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | HOUR | ELEM | LEVEL | NOBS | NGE | PGE | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| CG2248 | ALL | P | SUR | 51 | 51 | 100 | 0.0 | 0.0 | 0.0 |
| CYLX | ALL | P | SUR | 26 | 26 | 100 | 0.0 | 0.0 | 0.0 |
| C6HQ05 | ALL | P | SUR | 41 | 1 | 2 | 1.0 | -5.8 | 5.8 |
| DUWH | ALL | P | SUR | 131 | 3 | 2 | 2.4 | -4.5 | 5.0 |
| MWZD2 | ALL | P | SUR | 22 | 0 | 0 | 1.1 | 5.2 | 5.3 |
| PCBU | ALL | P | SUR | 20 | 0 | 0 | 1.2 | 11.5 | 11.6 |
| PEUQ | ALL | P | SUR | 30 | 0 | 0 | 1.6 | -6.2 | 6.5 |
| UAMS | ALL | P | SUR | 35 | 5 | 14 | 5.0 | -5.0 | 7.1 |
| URFJ | ALL | P | SUR | 22 | 0 | 0 | 1.2 | 4.1 | 4.3 |
| VCJM | ALL | P | SUR | 26 | 26 | 100 | 0.0 | 0.0 | 0.0 |
| VGKM | ALL | P | SUR | 24 | 22 | 92 | 0.9 | -10.1 | 10.1 |
| VGMV | ALL | P | SUR | 26 | 16 | 62 | 2.7 | -11.7 | 12.0 |
| V2XO | ALL | P | SUR | 55 | 0 | 0 | 1.5 | -6.7 | 6.9 |
| WCB5820 | ALL | P | SUR | 23 | 0 | 0 | 1.1 | 5.4 | 5.5 |
| WE7207 | ALL | P | SUR | 23 | 6 | 26 | 1.6 | -0.2 | 1.6 |
| WRGL | ALL | P | SUR | 46 | 0 | 0 | 2.5 | 5.1 | 5.7 |
| 3FUQ7 | ALL | P | SUR | 49 | 1 | 2 | 1.9 | 4.5 | 4.9 |
| WIND SPEED | | | | | | | | | |
| C6JD4 | ALL | SPEED | SUR | 20 | 0 | 0 | 1.2 | -6.0 | 6.1 |
| DQVK | ALL | SPEED | SUR | 78 | 0 | 0 | 5.3 | 6.5 | 8.3 |
| ELND4 | ALL | SPEED | SUR | 69 | 0 | 0 | 3.3 | 5.5 | 6.4 |
| ELRR5 | ALL | SPEED | SUR | 20 | 1 | 5 | 3.9 | 5.7 | 6.9 |
| ELUO7 | ALL | SPEED | SUR | 35 | 2 | 6 | 8.6 | 10.8 | 13.8 |
| FNTS | ALL | SPEED | SUR | 52 | 0 | 0 | 5.1 | 8.5 | 9.9 |
| MWQD5 | ALL | SPEED | SUR | 25 | 0 | 0 | 5.0 | 5.8 | 7.6 |
| PJOX | ALL | SPEED | SUR | 20 | 0 | 0 | 3.7 | 7.7 | 8.5 |
| SYFT | ALL | SPEED | SUR | 28 | 0 | 0 | 4.0 | 7.1 | 8.2 |
| SYMK | ALL | SPEED | SUR | 55 | 0 | 0 | 2.6 | 5.3 | 5.9 |
| UBCB | ALL | SPEED | SUR | 46 | 0 | 0 | 2.0 | 5.5 | 5.8 |
| UDDC | ALL | SPEED | SUR | 21 | 0 | 0 | 15.9 | 5.0 | 16.6 |
| VRUM3 | ALL | SPEED | SUR | 38 | 0 | 0 | 2.9 | 5.3 | 6.0 |
| WSQ2738 | ALL | SPEED | SUR | 111 | 0 | 0 | 4.0 | 5.1 | 6.5 |
| 3EMJ6 | ALL | SPEED | SUR | 64 | 0 | 0 | 3.3 | 6.9 | 7.6 |
| 3FTR6 | ALL | SPEED | SUR | 76 | 0 | 0 | 4.6 | 5.1 | 6.9 |
| 9VXB | ALL | SPEED | SUR | 21 | 0 | 0 | 2.8 | 5.9 | 6.5 |
| WIND DIRECTION | | | | | | | | | |
| 32319 | ALL | DIRN. | SUR | 30 | 0 | 0 | 16.5 | 106.2 | 107.5 |
| 45135 | ALL | DIRN. | SUR | 118 | 0 | 0 | 25.2 | 77.6 | 81.5 |
| 51015 | ALL | DIRN. | SUR | 32 | 0 | 0 | 20.9 | -32.5 | 38.7 |
| 62112 | ALL | DIRN. | SUR | 374 | 0 | 0 | 89.9 | 0.6 | 89.9 |
| 62162 | ALL | DIRN. | SUR | 22 | 0 | 0 | 83.5 | 63.9 | 105.2 |
| 63104 | ALL | DIRN. | SUR | 139 | 0 | 0 | 127.1 | -46.6 | 135.4 |
| 63112 | ALL | DIRN. | SUR | 20 | 0 | 0 | 90.7 | -5.7 | 90.8 |
| 63113 | ALL | DIRN. | SUR | 200 | 0 | 0 | 18.6 | -61.8 | 64.5 |

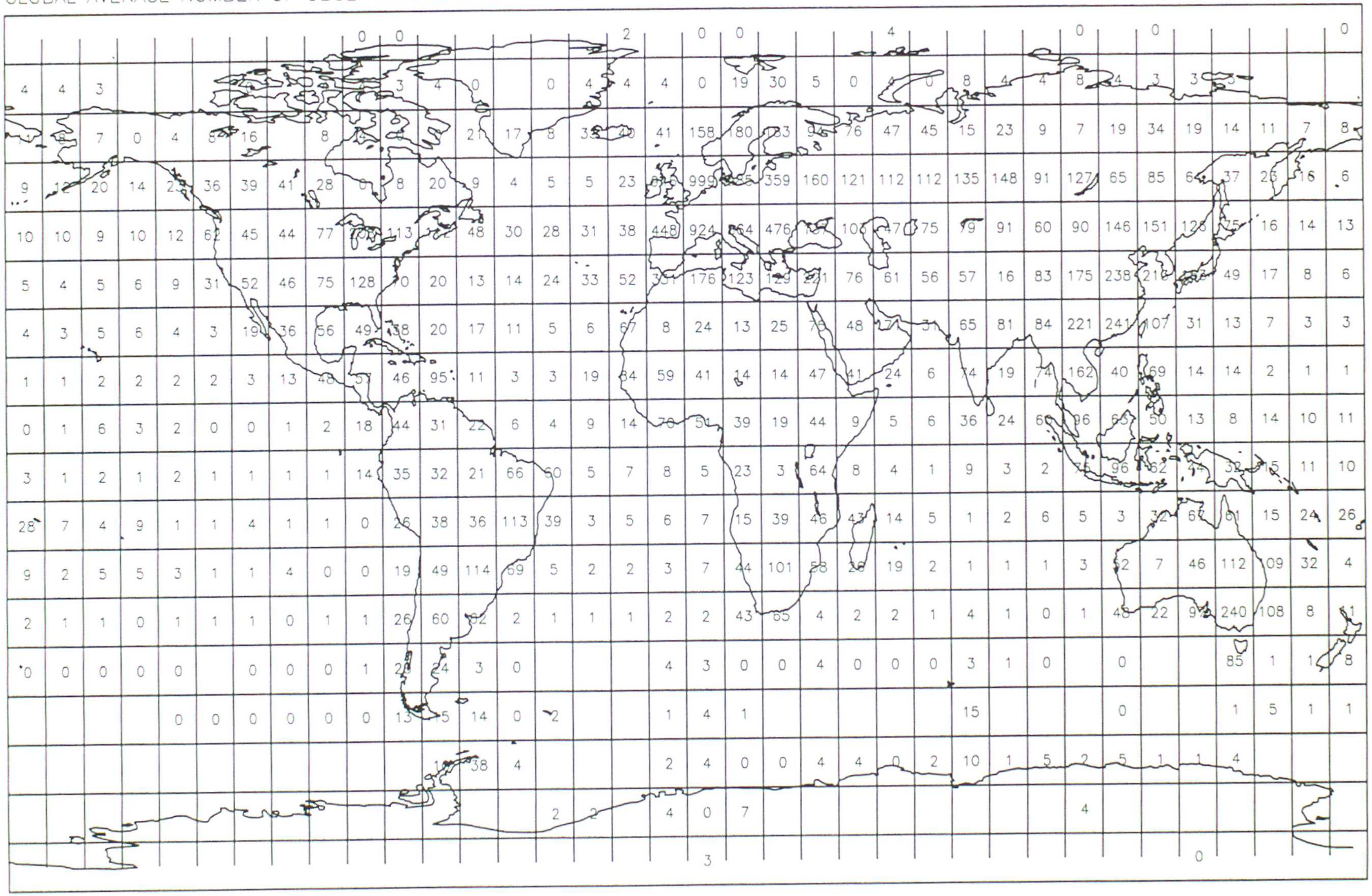
AVAILABILITY – SHIP/SYNOP – MAY 1998

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 21181

FIGURE 1



# TABLE 2

## MONITORING OF MARINE SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - DRIFTING BUOYS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | | | |
|---|---|---|---|
| **Period** | | :One calendar month. | |
| **Data monitored** | | :Reports from each unique identifier for drifting buoys. | |
| **Standard of comparison** | | :Background field from Bracknell global model. | |
| **Position** | | :Average latitude and longitude for period. | |
| **Observation times** | | :00, 06, 12, 18 UTC | |
| **Elements monitored** | | :Mean sea level pressure (hPa).<br>:Wind speed (m $s^{-1}$).<br>:Wind direction (degrees). | |
| **Parameters monitored** | | | |
| | :NOBS | :Number of observations received excluding duplicates. | |
| | :NGE | :Number of observations with gross errors. | |
| | :PGE | :Percentage of observations with gross errors. | |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. | |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors.<br>**N.B. a positive bias indicates the observation is veered to the background.** | |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors. | |
| **GROSS ERROR LIMIT** | :15 hPa<br>:25 m $s^{-1}$ | (pressure)<br>(vector wind) | |
| **SELECTION CRITERIA :** | NOBS | ≥ 20 , and one or more of the following: | |
| | 1.\| bias\| | ≥ 4 hPa<br>≥ 5 m $s^{-1}$<br>≥ 30 degrees | (pressure),<br>(wind speed),<br>(direction). |
| | 2.SD | ≥ 6 hPa<br>≥ 80 degrees | (pressure),<br>(direction). |
| | 3.PGE | ≥ 25. | |

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | LAT. | LONG. | HOUR | ELEM | LEVEL | NOBS | NGE | PGE | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | | | |
| 17511 | -37.9 | 74.5 | ALL | P | SUR | 181 | 0 | 0 | 1.8 | -4.5 | 4.9 |
| 33572 | -38.0 | -5.0 | ALL | P | SUR | 159 | 10 | 6 | 3.5 | 5.7 | 6.7 |
| 41524 | 17.9 | -62.9 | ALL | P | SUR | 275 | 0 | 0 | 1.0 | -5.7 | 5.7 |
| 47543 | 79.1 | -71.7 | ALL | P | SUR | 67 | 0 | 0 | 4.6 | -5.5 | 7.2 |
| 54920 | -30.5 | -95.1 | ALL | P | SUR | 208 | 57 | 27 | 3.8 | -1.4 | 4.0 |
| 54928 | -39.8 | -100.9 | ALL | P | SUR | 216 | 29 | 13 | 1.9 | -11.6 | 11.7 |
| 54931 | -43.6 | -121.3 | ALL | P | SUR | 280 | 0 | 0 | 6.1 | 3.2 | 6.9 |
| WIND SPEED | | | | | | | | | | | |
| 52534 | 10.1 | 125.7 | ALL | SPEED | SUR | 70 | 0 | 0 | 1.2 | -5.0 | 5.1 |
| 62803 | 63.5 | 7.2 | ALL | SPEED | SUR | 28 | 0 | 0 | 1.8 | -5.1 | 5.5 |
| WIND DIRECTION | | | | | | | | | | | |
| 13502 | 15.8 | -36.8 | ALL | DIRN. | SUR | 184 | 0 | 0 | 25.6 | 30.6 | 39.9 |
| 41501 | 19.7 | -44.0 | ALL | DIRN. | SUR | 65 | 0 | 0 | 42.4 | 39.8 | 58.2 |
| 41520 | 16.1 | -41.7 | ALL | DIRN. | SUR | 144 | 0 | 0 | 21.9 | 30.4 | 37.5 |
| 46632 | 54.0 | -152.1 | ALL | DIRN. | SUR | 578 | 0 | 0 | 25.3 | -32.2 | 40.9 |
| 52534 | 10.1 | 125.7 | ALL | DIRN. | SUR | 115 | 0 | 0 | 52.8 | -60.4 | 80.2 |
| 52540 | 13.4 | 144.7 | ALL | DIRN. | SUR | 146 | 0 | 0 | 16.5 | 63.9 | 66.0 |
| 52624 | -14.6 | 138.8 | ALL | DIRN. | SUR | 215 | 0 | 0 | 20.4 | 36.5 | 41.9 |
| 52657 | 26.4 | 127.8 | ALL | DIRN. | SUR | 162 | 0 | 0 | 118.5 | 6.4 | 118.7 |
| 62756 | 44.2 | -3.3 | ALL | DIRN. | SUR | 37 | 0 | 0 | 20.2 | -32.0 | 37.9 |
| 62803 | 63.5 | 7.2 | ALL | DIRN. | SUR | 80 | 0 | 0 | 123.5 | -52.7 | 134.2 |

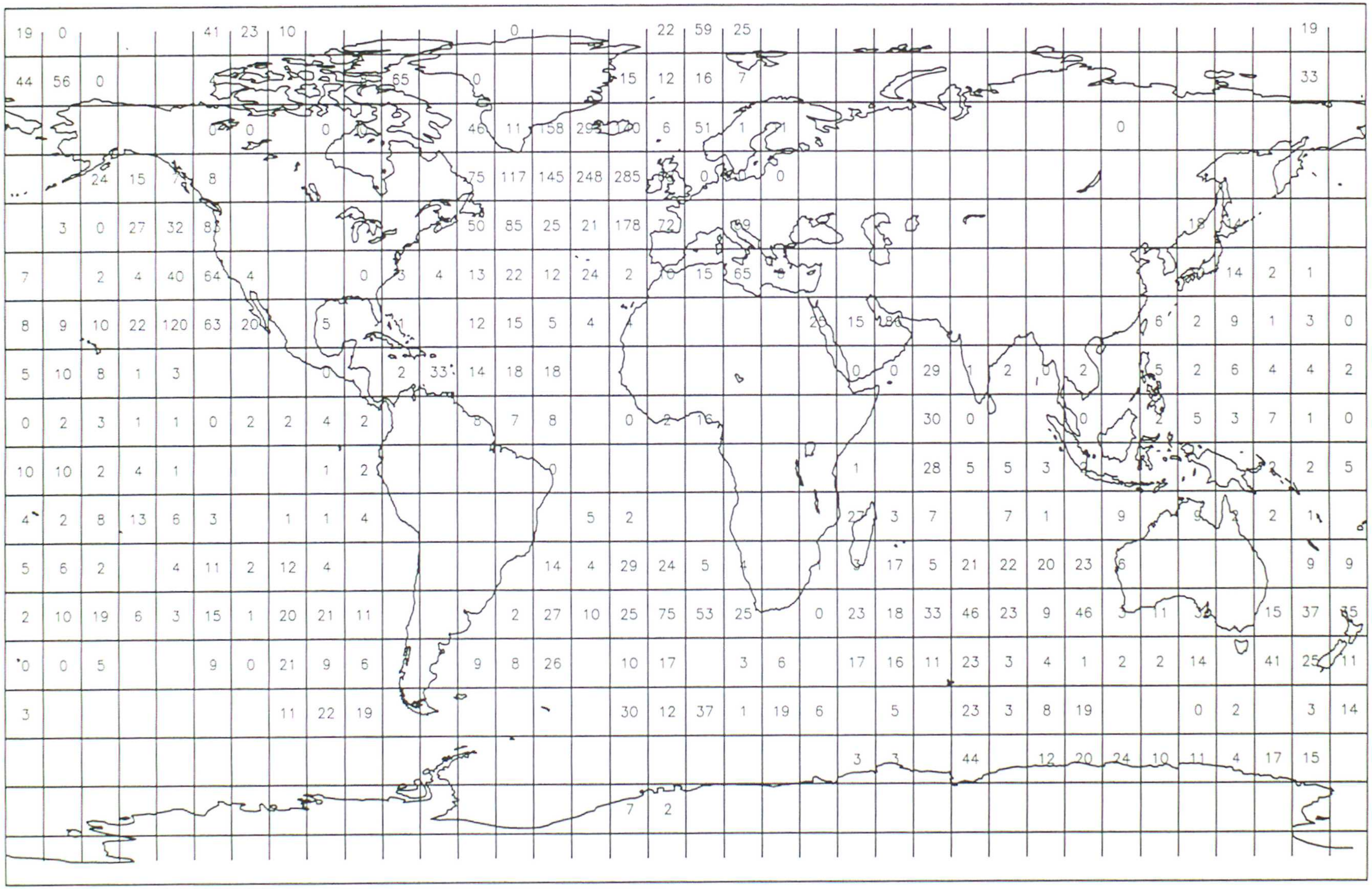
AVAILABILITY – DRIFTER – MAY 1998

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 5733

FIGURE 2


19 0 41 23 10 0 22 59 25 19
44 56 0 65 0 15 12 16 7 33
0 0 0 0 46 11 158 6 51 1 0
24 15 8 75 117 145 248 285 0 0
3 0 27 32 50 85 25 21 178 72 18
7 2 4 40 64 4 0 4 13 22 12 24 2 15 65 14 2 1
8 9 10 22 120 63 20 5 12 15 5 4 15 6 2 9 1 3 0
5 10 8 1 3 0 2 33 14 18 18 0 0 29 1 2 2 5 2 6 4 4 2
0 2 3 1 1 0 2 2 4 2 7 8 0 16 30 0 0 5 3 7 1 0
10 10 2 4 1 1 2 1 28 5 5 3 2 5
4 2 8 13 6 3 1 1 4 5 2 3 7 7 1 9 2 1
5 6 2 4 11 2 12 4 14 4 29 24 5 17 5 21 22 20 23 9 9
2 10 19 6 3 15 1 20 21 11 2 27 10 25 75 53 25 0 23 18 33 46 23 9 46 15 37
0 0 5 9 0 21 9 6 9 8 26 10 17 3 6 17 16 11 23 3 4 1 2 2 14 41 11
3 11 22 19 30 12 37 1 19 6 5 23 3 8 19 0 2 3 14
3 44 12 20 24 10 11 4 17 15
7 2

## TABLE 3

## MONITORING OF LAND SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for synops & autosynops. |
| **Standard of comparison** | | :Background field from Bracknell global model. |
| **Observation times** | | :00, 06, 12, 18 UTC |
| **Elements monitored** | | :Mean sea level pressure (hPa). |
| **Parameters monitored** | :HT(m) | :Station height (in metres) as given in WMO No. 9 Vol A |
| | :RP | :Pressure reporting practice<br>M=mean sea level pressure (hPa) reported.<br>S=Station level pressure reported.<br>8=Geopotential height (m) of 850 hPa surface reported.<br>7=Geopotential height (m) of 700 hPa surface reported. |
| | :NOBS | :Number of observations received excluding duplicates. |
| | :NGE | :Number of observations with gross errors. |
| | :PGE | :Percentage of observations with gross errors. |
| | :%REJ | :Percentage of observations flagged. |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors. |
| **GROSS ERROR LIMIT** | :15 hPa | (pressure) |
| **SELECTION CRITERIA** | :NOBS | ≥ 20 ,and one or more of the following: |
| | 1.\| bias\| | ≥ 4 hPa |
| | 2. SD | ≥ 6 hPa |
| | 3.PGE | ≥ 25. |

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60010 | 28.3N | 16.5W | 2367 | S7 | 89 | 0 | 0 | 1 | 2.3 | -4.6 | 5.1 |
| 60445 | 36.2N | 5.4E | 1081 | S8 | 117 | 2 | 2 | 3 | 1.3 | 4.7 | 4.9 |
| 60468 | 35.6N | 6.2E | 1052 | S8 | 112 | 112 | 100 | 1 | 0.0 | 0.0 | 0.0 |
| 60511 | 35.3N | 1.4E | 1127 | S8 | 117 | 83 | 71 | 1 | 0.3 | 14.4 | 14.4 |
| 60535 | 34.7N | 3.3E | 1144 | S8 | 87 | 0 | 0 | 0 | 0.8 | -6.2 | 6.3 |
| 60571 | 31.6N | 2.2W | 773 | S8 | 120 | 2 | 2 | 1 | 0.9 | -4.5 | 4.6 |
| 60670 | 24.6N | 9.5E | 1054 | S8 | 104 | 0 | 0 | 2 | 1.7 | 9.3 | 9.5 |
| 62790 | 12.1N | 24.9E | 674 | MS | 63 | 3 | 5 | 10 | 1.8 | 4.1 | 4.5 |
| 63330 | 13.5N | 39.5E | 2070 | MS | 52 | 52 | 100 | 0 | 0.0 | 0.0 | 0.0 |
| 63334 | 10.3N | 37.7E | 2515 | MS | 80 | 0 | 0 | 1 | 1.0 | 10.3 | 10.3 |
| 63402 | 7.7N | 36.8E | 1725 | MS | 55 | 0 | 0 | 0 | 1.0 | 7.7 | 7.8 |
| 63450 | 9.0N | 38.8E | 2354 | MS | 91 | 0 | 0 | 1 | 1.3 | 4.8 | 5.0 |
| 63471 | 9.6N | 41.9E | 1260 | MS | 44 | 2 | 5 | 2 | 0.9 | 10.3 | 10.3 |
| 63478 | 5.9N | 43.6E | 295 | MS | 33 | 0 | 0 | 3 | 2.0 | 7.6 | 7.9 |
| 68343 | 27.6S | 25.6E | 1228 | S8 | 114 | 0 | 0 | 101 | 0.9 | -10.2 | 10.2 |
| 68442 | 29.1S | 26.3E | 1359 | S8 | 115 | 0 | 0 | 98 | 0.9 | -4.7 | 4.8 |
| 69679 | 43.9N | 18.3E | 1557 | M | 20 | 20 | 100 | 0 | 0.0 | 0.0 | 0.0 |

WMO REGION 2:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30320 | 56.9N | 105.7E | 669 | MS | 113 | 58 | 51 | 1 | 2.3 | 0.3 | 2.3 |
| 30554 | 54.5N | 113.6E | 995 | MS | 120 | 1 | 1 | 51 | 5.2 | 4.7 | 7.0 |
| 40743 | 36.2N | 57.7E | 941 | MS | 111 | 1 | 1 | 0 | 1.3 | -5.4 | 5.6 |
| 40762 | 35.3N | 59.2E | 1333 | MS | 109 | 14 | 13 | 0 | 1.5 | -13.1 | 13.2 |
| 41254 | 23.1N | 57.7E | 1755 | S8 | 55 | 55 | 100 | 0 | 0.0 | 0.0 | 0.0 |
| 44416 | 28.6N | 81.6E | 720 | MS | 67 | 3 | 4 | 7 | 2.2 | 4.4 | 4.9 |
| 44477 | 27.0N | 87.4E | 1445 | S8 | 71 | 70 | 99 | 1 | 0.0 | 8.3 | 8.3 |
| 52602 | 38.8N | 93.4E | 2734 | S | 123 | 0 | 0 | 1 | 1.2 | -6.6 | 6.7 |
| 53588 | 39.0N | 113.5E | 2898 | S | 121 | 121 | 100 | 1 | 0.0 | 0.0 | 0.0 |
| 54587 | 39.1N | 123.2E | 53 | M | 90 | 1 | 1 | 2 | 1.5 | -4.2 | 4.5 |
| 56021 | 34.1N | 95.8E | 4176 | S | 123 | 0 | 0 | 0 | 1.1 | -4.4 | 4.5 |
| 56144 | 31.8N | 98.6E | 3184 | M | 108 | 1 | 1 | 1 | 1.3 | -5.0 | 5.2 |
| 56385 | 29.5N | 103.3E | 3049 | S | 123 | 0 | 0 | 10 | 1.5 | -6.0 | 6.2 |
| 56444 | 28.5N | 98.9E | 3488 | S | 117 | 58 | 50 | 14 | 0.6 | 13.9 | 13.9 |
| 56462 | 29.0N | 101.5E | 2994 | S | 116 | 0 | 0 | 0 | 1.7 | 7.6 | 7.8 |

WMO REGION 3:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 80099 | 7.1N | 70.7W | 128 | MS | 27 | 1 | 4 | 4 | 1.8 | -5.4 | 5.7 |
| 82704 | 7.6S | 72.7W | 170 | MS | 79 | 0 | 0 | 0 | 1.5 | -5.3 | 5.5 |
| 83214 | 10.3S | 54.9W | 285 | MS | 57 | 0 | 0 | 4 | 2.2 | -6.7 | 7.1 |
| 83235 | 12.4S | 46.4W | 604 | MS | 79 | 1 | 1 | 54 | 0.9 | 5.5 | 5.6 |
| 83319 | 14.7S | 52.4W | 315 | MS | 61 | 0 | 0 | 0 | 1.1 | -5.4 | 5.5 |
| 83332 | 14.1S | 46.4W | 826 | MS | 78 | 0 | 0 | 1 | 1.1 | 12.3 | 12.3 |
| 83408 | 14.3S | 43.8W | 447 | MS | 78 | 0 | 0 | 58 | 1.4 | 8.9 | 9.0 |
| 83423 | 16.7S | 49.3W | 741 | MS | 78 | 0 | 0 | 0 | 1.0 | -6.0 | 6.1 |
| 83488 | 17.8S | 42.9W | 1097 | MS | 78 | 78 | 100 | 1 | 0.0 | 0.0 | 0.0 |
| 83531 | 18.6S | 46.5W | 940 | MS | 75 | 1 | 1 | 45 | 1.6 | -6.9 | 7.1 |
| 83587 | 19.9S | 43.9W | 850 | MS | 81 | 0 | 0 | 0 | 1.2 | -6.9 | 7.0 |
| 83704 | 22.3S | 53.9W | 369 | MS | 61 | 11 | 18 | 67 | 3.2 | -8.9 | 9.5 |
| 83773 | 23.1S | 48.9W | 793 | S | 43 | 0 | 0 | 0 | 1.0 | -6.6 | 6.7 |
| 84401 | 5.2S | 80.6W | 49 | MS | 89 | 0 | 0 | 0 | 1.6 | 6.0 | 6.2 |
| 84455 | 6.5S | 76.4W | 281 | MS | 63 | 0 | 0 | 0 | 1.1 | 6.1 | 6.2 |
| 84472 | 7.1S | 78.5W | 2620 | S | 42 | 1 | 2 | 0 | 0.8 | -5.9 | 6.0 |
| 84686 | 13.6S | 72.0W | 3248 | S | 105 | 0 | 0 | 0 | 1.1 | -4.8 | 4.9 |
| 84782 | 18.1S | 70.3W | 468 | MS | 89 | 0 | 0 | 0 | 1.4 | 7.6 | 7.7 |
| 85406 | 18.3S | 70.3W | 55 | M | 122 | 0 | 0 | 0 | 1.3 | 5.1 | 5.3 |

### WMO REGION 4:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 76625 | 20.6N | 100.4W | 1813 | MS | 41 | 0 | 0 | 2 | 1.4 | -6.6 | 6.7 |
| 76632 | 20.1N | 98.7W | 2417 | MS | 35 | 0 | 0 | 0 | 0.8 | -5.0 | 5.1 |
| 76658 | 19.2N | 103.7W | 494 | MS | 27 | 0 | 0 | 0 | 1.2 | 7.4 | 7.5 |
| 76698 | 19.6N | 88.0W | 20 | M | 74 | 0 | 0 | 0 | 1.0 | -5.6 | 5.7 |
| 76762 | 17.5N | 99.5W | 1865 | MS | 48 | 48 | 100 | 2 | 0.0 | 0.0 | 0.0 |
| 76775 | 17.1N | 96.7W | 1550 | MS | 40 | 0 | 0 | 5 | 1.5 | 4.0 | 4.3 |
| 76845 | 16.7N | 92.6W | 2276 | MS | 79 | 78 | 99 | 1 | 0.0 | 14.5 | 14.5 |
| 78718 | 14.4N | 87.6W | 626 | MS | 50 | 49 | 98 | 74 | 0.0 | -14.5 | 14.5 |

### WMO REGION 5:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 94328 | 22.4S | 133.6E | 623 | MS | 93 | 0 | 0 | 0 | 0.7 | 6.5 | 6.5 |
| 94955 | 41.6S | 145.7E | 684 | MS | 113 | 113 | 100 | 1 | 0.0 | 0.0 | 0.0 |
| 95952 | 41.9S | 145.6E | 560 | MS | 119 | 119 | 100 | 1 | 0.0 | 0.0 | 0.0 |

### WMO REGION 6:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 02045 | 67.8N | 20.4E | 408 | M | 112 | 112 | 100 | 1 | 0.0 | 0.0 | 0.0 |
| 03305 | 53.1N | 3.9W | 216 | M | 360 | 360 | 100 | 6 | 0.0 | 0.0 | 0.0 |
| 04416 | 72.6N | 38.4W | 3202 | S7 | 93 | 4 | 4 | 0 | 1.7 | -4.3 | 4.6 |
| 10850 | 48.8N | 10.7E | 457 | MS | 269 | 80 | 30 | 15 | 3.0 | -2.5 | 3.9 |
| 16227 | 41.9N | 13.6E | 655 | MS | 138 | 130 | 94 | 0 | 0.3 | -14.4 | 14.4 |
| 16549 | 39.1N | 8.3E | 12 | MS | 95 | 0 | 0 | 0 | 0.8 | -4.3 | 4.4 |
| 16614 | 40.4N | 21.3E | 604 | MS | 95 | 0 | 0 | 0 | 1.1 | -6.7 | 6.8 |
| 17092 | 39.8N | 39.5E | 1218 | S8 | 121 | 0 | 0 | 64 | 3.3 | 4.0 | 5.2 |
| 17203 | 38.9N | 40.5E | 1177 | S8 | 41 | 0 | 0 | 0 | 0.9 | 4.2 | 4.3 |

### ANTARCTIC:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89004 | 71.7S | 2.8W | 815 | M | 347 | 2 | 1 | 1 | 3.6 | -5.1 | 6.2 |
| 89108 | 89.0S | 0.3W | 2754 | S | 269 | 0 | 0 | 1 | 3.1 | 4.6 | 5.5 |
| 89264 | 71.4S | 68.9W | 780 | S | 224 | 0 | 0 | 2 | 2.7 | 6.2 | 6.8 |
| 89345 | 89.7S | 148.8W | 620 | S | 346 | 88 | 25 | 1 | 6.0 | -5.9 | 8.4 |

## TABLE 4

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Statistics for each airline carrier.

**Area monitored** :90°N - 90°S, 180°W - 180°E.

**Standard of comparison** :Background field from Bracknell global model.

**Observation times** :All hours combined.

**Level(s) monitored** :70.0 - 500.0 hPa

**Elements monitored** :TEMP in °C ; WIND in m s$^{-1}$

**Parameters monitored**

- :N REP. :Number of observations received excluding duplicates.
- :PG :Percentage of observations with gross errors.
- :PR :Percentage of observations rejected by quality control including rejections from the duplicate check.
- :PC :Percentage of observations with calm winds.
- :RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
- :BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

**GROSS ERROR LIMITS** :10.0 °C ; 60 m s$^{-1}$ Vector Wind

**SELECTION CRITERIA** :N REP $\geq$ 20

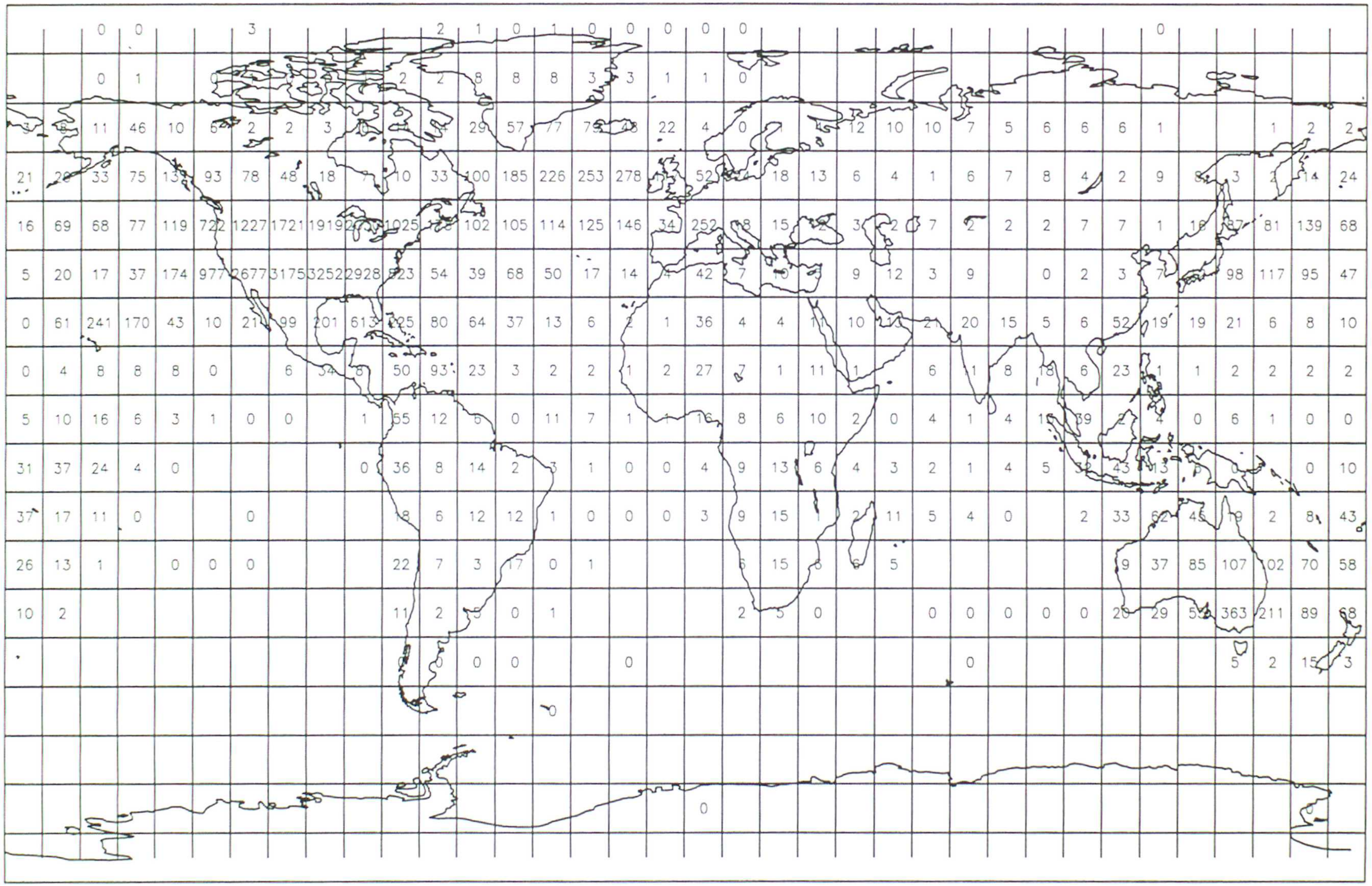
**NB:** US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAA | 117 | 2 | 12 | 1.6 | 0.5 | 115 | 0 | 10 | 0 | 8.0 | 0.6 |
| AAH | 64 | 23 | 44 | 2.9 | 1.4 | 48 | 0 | 19 | 0 | 9.4 | 0.0 |
| AAL | 6769 | 1 | 28 | 1.8 | 0.0 | 5754 | 0 | 22 | 0 | 7.5 | 0.7 |
| AAR | 1612 | 0 | 6 | 1.8 | -0.6 | 1601 | 0 | 8 | 0 | 9.0 | 0.4 |
| ACA | 1749 | 0 | 10 | 1.9 | -0.2 | 1638 | 0 | 5 | 0 | 7.0 | 0.7 |
| ACI | 77 | 3 | 38 | 1.4 | 0.3 | 77 | 0 | 38 | 0 | 9.4 | 3.2 |
| AEA | 502 | 1 | 22 | 2.7 | 1.0 | 438 | 0 | 16 | 1 | 8.9 | 0.3 |
| AEL | 719 | 0 | 10 | 1.5 | -0.4 | 719 | 0 | 11 | 0 | 8.6 | 0.5 |
| AEY | 125 | 0 | 3 | 1.6 | 0.6 | 124 | 0 | 3 | 0 | 8.8 | 0.3 |
| AFL | 434 | 1 | 12 | 2.2 | 0.5 | 397 | 1 | 6 | 0 | 7.4 | 0.6 |
| AFR | 1848 | 1 | 13 | 1.5 | 0.0 | 1805 | 0 | 12 | 0 | 7.4 | 0.9 |
| AIH | 232 | 1 | 11 | 1.8 | 0.0 | 199 | 0 | 7 | 1 | 8.0 | 0.9 |
| AJM | 103 | 1 | 10 | 1.5 | -0.7 | 95 | 0 | 9 | 0 | 9.8 | 1.3 |
| AMT | 700 | 0 | 100 | 1.5 | 0.5 | 682 | 0 | 46 | 1 | 7.5 | 0.3 |
| AMX | 307 | 2 | 7 | 1.7 | 0.1 | 301 | 1 | 5 | 0 | 7.5 | 0.5 |
| ANA | 1164 | 0 | 9 | 1.7 | 0.0 | 1152 | 0 | 10 | 0 | 8.6 | 0.8 |
| ANO | 28 | 0 | 0 | 0.5 | 0.2 | 28 | 0 | 0 | 0 | 8.4 | 2.5 |
| ANZ | 3850 | 1 | 37 | 1.8 | 0.2 | 3822 | 0 | 36 | 0 | 8.8 | 0.8 |
| AOM | 667 | 1 | 7 | 1.7 | 0.9 | 648 | 0 | 8 | 0 | 8.7 | 0.7 |
| ARG | 50 | 6 | 56 | 3.4 | 1.8 | 48 | 4 | 60 | 0 | 18.0 | 0.9 |
| AUA | 30 | 3 | 33 | 3.2 | -1.6 | 21 | 0 | 10 | 0 | 8.9 | 1.9 |
| AVA | 444 | 1 | 4 | 1.9 | 0.0 | 443 | 0 | 4 | 0 | 9.5 | -0.1 |
| AVN | 95 | 1 | 7 | 1.1 | 0.4 | 95 | 0 | 7 | 0 | 8.8 | -0.7 |
| AXA | 119 | 0 | 37 | 1.0 | 0.1 | 117 | 0 | 39 | 0 | 11.0 | 0.3 |
| AZA | 384 | 4 | 22 | 2.1 | 0.0 | 321 | 0 | 13 | 0 | 8.3 | 0.3 |
| BAL | 913 | 1 | 17 | 1.6 | -0.4 | 898 | 0 | 16 | 0 | 7.9 | 0.7 |
| BAW | 1852 | 1 | 22 | 2.0 | -0.2 | 1617 | 0 | 17 | 0 | 7.3 | 0.8 |
| BBB | 57 | 0 | 16 | 1.6 | -0.4 | 50 | 0 | 6 | 0 | 9.9 | 1.1 |
| BWA | 365 | 1 | 10 | 1.8 | 0.3 | 326 | 0 | 8 | 0 | 8.7 | 0.0 |
| CAL | 1972 | 0 | 8 | 1.6 | -0.2 | 1965 | 0 | 10 | 0 | 9.9 | 0.4 |
| CCA | 185 | 1 | 16 | 3.0 | 0.5 | 197 | 1 | 100 | 0 | 11.7 | 0.3 |
| CDN | 2020 | 0 | 10 | 1.8 | 0.3 | 1983 | 0 | 10 | 0 | 8.2 | 0.6 |
| CES | 397 | 0 | 6 | 1.7 | 0.2 | 399 | 2 | 9 | 0 | 9.5 | 0.9 |
| CFC | 28 | 0 | 21 | 2.6 | 1.1 | 27 | 0 | 26 | 0 | 12.2 | 5.8 |
| CFG | 1153 | 1 | 6 | 1.9 | -1.0 | 1117 | 0 | 5 | 0 | 8.9 | 0.5 |
| CKS | 415 | 1 | 77 | 2.0 | 0.7 | 400 | 0 | 45 | 0 | 8.3 | 0.2 |
| CKT | 202 | 0 | 14 | 1.5 | 0.5 | 184 | 0 | 9 | 0 | 7.7 | -0.4 |
| CLX | 387 | 1 | 11 | 1.9 | -0.5 | 369 | 0 | 7 | 0 | 6.4 | 0.6 |
| CMI | 597 | 0 | 4 | 1.4 | 0.2 | 591 | 1 | 5 | 0 | 8.2 | 0.7 |
| CMM | 439 | 0 | 10 | 1.7 | 0.1 | 412 | 0 | 8 | 0 | 6.6 | 0.9 |
| COA | 2083 | 0 | 32 | 1.5 | 0.2 | 1787 | 0 | 31 | 0 | 10.1 | 1.5 |
| CPA | 74 | 0 | 9 | 2.3 | 0.0 | 74 | 0 | 8 | 1 | 7.2 | 0.9 |
| CRL | 516 | 2 | 7 | 1.7 | 0.8 | 500 | 0 | 7 | 0 | 8.2 | 0.5 |
| CSA | 26 | 4 | 23 | 1.4 | -0.8 | 21 | 0 | 14 | 0 | 5.0 | 1.5 |
| CSN | 100 | 1 | 7 | 2.0 | 0.5 | 99 | 0 | 6 | 0 | 10.0 | 1.3 |
| CTB | 276 | 2 | 4 | 1.7 | -0.4 | 272 | 0 | 2 | 0 | 6.6 | 1.0 |
| CTM | 46 | 0 | 17 | 1.9 | -0.9 | 46 | 0 | 15 | 0 | 7.2 | 1.0 |
| CUB | 605 | 1 | 6 | 2.1 | 1.0 | 595 | 0 | 100 | 1 | 9.8 | 0.9 |
| DAL | 6595 | 1 | 33 | 2.0 | 0.2 | 5585 | 0 | 28 | 0 | 7.3 | 0.7 |
| DBY | 390 | 0 | 3 | 1.5 | -1.0 | 392 | 1 | 5 | 0 | 8.3 | 0.5 |
| DHL | 204 | 6 | 45 | 4.4 | -2.6 | 159 | 0 | 18 | 0 | 9.4 | 1.1 |
| DLH | 3353 | 1 | 15 | 1.8 | 0.0 | 3095 | 0 | 10 | 0 | 7.2 | 0.7 |
| EIA | 447 | 0 | 34 | 1.3 | 0.1 | 441 | 0 | 36 | 0 | 9.4 | 1.5 |
| EIN | 28 | 0 | 0 | 1.7 | -0.3 | 29 | 0 | 0 | 0 | 5.3 | 1.5 |
| ELY | 110 | 0 | 7 | 1.3 | -0.2 | 110 | 0 | 7 | 0 | 7.7 | 1.6 |
| EVA | 2149 | 1 | 8 | 1.7 | -0.4 | 2180 | 0 | 9 | 0 | 8.9 | 0.4 |
| EWW | 99 | 7 | 16 | 2.0 | 1.0 | 93 | 0 | 46 | 0 | 12.0 | 3.3 |
| FDX | 1274 | 0 | 19 | 1.5 | 0.5 | 1221 | 0 | 18 | 0 | 8.1 | 0.9 |
| FIN | 408 | 1 | 21 | 1.9 | 0.4 | 333 | 0 | 12 | 0 | 6.9 | 0.6 |

|  |  | TEMPERATURE |  |  |  |  |  | WIND |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| FJI | 772 | 2 | 41 | 1.6 | 0.5 | 763 | 0 | 40 | 1 | 9.6 | 0.6 |
| FOM | 166 | 2 | 43 | 1.5 | 0.1 | 163 | 0 | 44 | 1 | 10.6 | 0.5 |
| GAF | 184 | 1 | 32 | 2.9 | 0.5 | 134 | 0 | 19 | 0 | 8.1 | 0.5 |
| GCO | 81 | 0 | 27 | 1.6 | 1.2 | 82 | 0 | 51 | 1 | 7.4 | -0.5 |
| GHA | 77 | 1 | 6 | 1.9 | 0.6 | 59 | 0 | 5 | 0 | 9.5 | -1.4 |
| GIA | 34 | 0 | 26 | 1.7 | 0.8 | 34 | 0 | 26 | 0 | 9.4 | 1.6 |
| GTI | 26 | 0 | 0 | 2.2 | 1.0 | 27 | 0 | 11 | 0 | 11.7 | -1.4 |
| HAL | 3018 | 0 | 38 | 1.4 | 0.3 | 2960 | 0 | 38 | 1 | 8.3 | 0.7 |
| HLF | 89 | 2 | 19 | 2.2 | -1.0 | 77 | 0 | 13 | 0 | 9.6 | 0.3 |
| HRH | 138 | 5 | 62 | 1.8 | 0.4 | 134 | 1 | 81 | 0 | 9.3 | 2.4 |
| IBE | 2850 | 1 | 21 | 2.0 | 0.7 | 2556 | 0 | 16 | 0 | 8.3 | 0.5 |
| ICE | 966 | 0 | 26 | 1.9 | 0.0 | 732 | 0 | 16 | 0 | 6.6 | 0.6 |
| JAL | 6553 | 0 | 5 | 1.7 | 0.2 | 6528 | 0 | 6 | 0 | 8.5 | 0.8 |
| JKK | 255 | 1 | 36 | 2.0 | -0.2 | 196 | 0 | 24 | 1 | 8.3 | 0.2 |
| KAL | 3429 | 0 | 8 | 1.7 | -0.3 | 3425 | 0 | 10 | 0 | 9.2 | 0.4 |
| KIW | 26 | 0 | 38 | 3.7 | 2.8 | 26 | 0 | 38 | 0 | 15.6 | -2.1 |
| KLM | 3591 | 0 | 22 | 1.7 | -0.1 | 3379 | 0 | 20 | 0 | 7.4 | 0.7 |
| LAN | 48 | 17 | 44 | 4.3 | 2.0 | 47 | 2 | 19 | 0 | 9.8 | -0.1 |
| LAP | 48 | 6 | 35 | 4.4 | -0.2 | 48 | 4 | 100 | 0 | 29.9 | 11.1 |
| LDA | 257 | 0 | 21 | 1.5 | -0.9 | 238 | 0 | 17 | 0 | 7.5 | 1.1 |
| LDI | 422 | 0 | 22 | 1.7 | -0.8 | 377 | 0 | 17 | 0 | 7.2 | -0.1 |
| LEI | 212 | 0 | 16 | 1.7 | 0.4 | 186 | 0 | 10 | 0 | 7.5 | 0.6 |
| LIB | 459 | 2 | 5 | 1.6 | 0.8 | 459 | 0 | 5 | 0 | 8.9 | 0.0 |
| LOT | 277 | 0 | 18 | 2.2 | -0.9 | 232 | 0 | 9 | 0 | 7.4 | 0.2 |
| LTU | 1059 | 1 | 22 | 1.7 | -0.2 | 897 | 0 | 14 | 0 | 7.5 | 0.8 |
| LXR | 48 | 2 | 31 | 2.2 | 0.2 | 44 | 5 | 27 | 0 | 10.3 | 1.5 |
| MAS | 421 | 1 | 13 | 1.7 | -0.3 | 422 | 0 | 11 | 0 | 8.3 | 0.7 |
| MDA | 149 | 1 | 4 | 1.9 | 0.6 | 151 | 1 | 10 | 0 | 11.4 | -1.8 |
| MON | 112 | 3 | 21 | 2.0 | 0.4 | 93 | 0 | 10 | 0 | 8.2 | 0.6 |
| MPD | 135 | 1 | 11 | 2.3 | 1.5 | 129 | 0 | 9 | 0 | 10.1 | -0.7 |
| MPH | 936 | 0 | 7 | 1.7 | -0.7 | 903 | 0 | 6 | 0 | 8.3 | 0.3 |
| NCA | 550 | 0 | 4 | 1.7 | 0.2 | 544 | 0 | 6 | 0 | 9.7 | 0.3 |
| NWA | 10943 | 0 | 13 | 1.8 | 0.5 | 10480 | 0 | 11 | 0 | 8.1 | 0.4 |
| OAL | 32 | 0 | 22 | 3.5 | 2.0 | 21 | 0 | 10 | 0 | 12.3 | 1.7 |
| PAC | 215 | 2 | 30 | 1.9 | 0.5 | 184 | 0 | 24 | 0 | 5.9 | 1.1 |
| PAL | 1282 | 0 | 12 | 1.5 | -0.4 | 1236 | 0 | 13 | 0 | 8.4 | 0.8 |
| PAO | 378 | 0 | 51 | 1.5 | 0.1 | 377 | 0 | 51 | 1 | 8.8 | 0.7 |
| QFA | 1651 | 1 | 36 | 1.6 | 0.2 | 1643 | 0 | 36 | 0 | 9.0 | 0.7 |
| RAF | 132 | 1 | 4 | 1.7 | 0.7 | 133 | 1 | 5 | 0 | 9.1 | 0.7 |
| RAM | 52 | 0 | 0 | 1.9 | 0.0 | 51 | 0 | 29 | 0 | 6.5 | 1.0 |
| RCH | 658 | 2 | 26 | 2.2 | 0.5 | 600 | 0 | 24 | 1 | 10.3 | 0.7 |
| RJA | 43 | 0 | 28 | 1.7 | 0.7 | 30 | 0 | 23 | 0 | 10.7 | 0.4 |
| RKA | 105 | 0 | 3 | 1.8 | -0.4 | 82 | 0 | 2 | 0 | 7.9 | 0.7 |
| ROY | 230 | 1 | 17 | 1.4 | -0.5 | 204 | 0 | 10 | 0 | 8.1 | 0.9 |
| RRR | 116 | 3 | 19 | 1.6 | -0.2 | 110 | 0 | 15 | 0 | 7.7 | 1.7 |
| RSL | 31 | 6 | 19 | 1.3 | -0.1 | 30 | 0 | 17 | 0 | 8.8 | 2.0 |
| SAA | 270 | 0 | 4 | 1.8 | -0.2 | 256 | 0 | 5 | 0 | 9.0 | -0.1 |
| SAB | 113 | 2 | 19 | 1.8 | 0.1 | 88 | 0 | 13 | 0 | 5.9 | 1.2 |
| SAS | 1093 | 0 | 1 | 1.7 | -0.1 | 1089 | 0 | 1 | 0 | 7.2 | 0.2 |
| SCX | 459 | 1 | 49 | 1.2 | 0.3 | 429 | 0 | 50 | 1 | 7.6 | -0.5 |
| SIA | 1330 | 0 | 6 | 1.5 | -0.6 | 1331 | 1 | 8 | 0 | 9.0 | 0.5 |
| SLR | 143 | 0 | 10 | 1.3 | -0.3 | 147 | 0 | 14 | 0 | 10.2 | 0.9 |
| SOL | 82 | 2 | 32 | 1.1 | -0.4 | 81 | 0 | 30 | 1 | 7.3 | 0.4 |
| SVA | 68 | 0 | 9 | 1.9 | 0.1 | 72 | 0 | 74 | 0 | 6.8 | 0.9 |
| SWR | 281 | 1 | 23 | 1.5 | 0.0 | 232 | 0 | 13 | 0 | 6.7 | 1.6 |
| TAP | 644 | 1 | 7 | 1.5 | -0.5 | 633 | 0 | 8 | 0 | 9.1 | 1.4 |
| TBA | 38 | 16 | 45 | 3.5 | 1.6 | 36 | 0 | 31 | 0 | 16.7 | -1.1 |
| THA | 562 | 1 | 10 | 1.5 | -0.3 | 558 | 0 | 11 | 0 | 9.2 | 0.8 |
| TOW | 93 | 0 | 22 | 2.1 | 0.4 | 82 | 0 | 20 | 0 | 8.7 | 1.2 |

|  | TEMPERATURE |  |  |  |  | WIND |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| TPA | 30 | 0 | 17 | 1.3 | -0.1 | 32 | 0 | 16 | 0 | 5.4 | 0.6 |
| TSC | 160 | 2 | 34 | 2.1 | 0.2 | 119 | 1 | 23 | 0 | 7.8 | 1.0 |
| TWA | 2225 | 1 | 34 | 1.8 | -0.2 | 1647 | 0 | 24 | 0 | 8.2 | 1.1 |
| UAL | 103800 | 1 | 88 | 1.3 | -0.1 | 103472 | 0 | 88 | 1 | 6.4 | 0.5 |
| UNS | 475 | 0 | 18 | 1.6 | 0.7 | 474 | 0 | 18 | 0 | 6.9 | 0.9 |
| UPS | 1120 | 1 | 37 | 1.7 | 0.1 | 1072 | 0 | 36 | 0 | 8.3 | 0.7 |
| USA | 342 | 1 | 30 | 2.0 | 0.1 | 247 | 0 | 64 | 0 | 8.5 | 0.8 |
| VIR | 407 | 1 | 17 | 1.9 | -0.3 | 352 | 0 | 9 | 0 | 7.7 | 1.0 |
| VKG | 56 | 0 | 2 | 1.4 | 0.3 | 56 | 0 | 2 | 0 | 6.9 | 0.3 |
| VRG | 268 | 4 | 36 | 2.4 | 1.1 | 243 | 0 | 60 | 0 | 12.4 | 1.3 |
| VSP | 162 | 2 | 21 | 2.0 | 0.6 | 161 | 2 | 22 | 0 | 10.6 | 1.3 |
| VVR | 64 | 2 | 44 | 2.6 | 0.4 | 68 | 0 | 38 | 0 | 11.4 | -0.3 |
| WOA | 91 | 2 | 12 | 1.6 | 0.3 | 88 | 1 | 10 | 0 | 6.4 | 0.9 |
| AN | 20756 | 0 | 0 | 1.3 | 0.1 | 20756 | 0 | 0 | 0 | 6.7 | 0.7 |
| BA | 23370 | 0 | 1 | 1.4 | 0.5 | 23304 | 0 | 13 | 0 | 6.3 | 0.9 |
| IT | 463 | 1 | 46 | 1.3 | 0.3 | 463 | 0 | 46 | 0 | 6.3 | 2.0 |
| KL | 11561 | 0 | 20 | 1.5 | 0.9 | 11553 | 0 | 26 | 0 | 6.4 | 0.6 |
| LH | 3477 | 0 | 0 | 1.6 | 0.8 | 3587 | 0 | 2 | 0 | 6.5 | 0.8 |
| MK | 2496 | 0 | 0 | 2.0 | 1.6 | 2487 | 0 | 1 | 0 | 8.2 | 0.9 |
| QF | 19568 | 0 | 1 | 1.2 | 0.5 | 19568 | 0 | 1 | 0 | 6.9 | 0.9 |
| SA | 3885 | 0 | 1 | 1.8 | 1.3 | 3884 | 0 | 48 | 0 | 6.9 | 1.0 |
| SV | 1740 | 0 | 1 | 1.5 | 1.0 | 1720 | 0 | 0 | 0 | 6.4 | 0.5 |
| UA | 2781 | 1 | 31 | 1.5 | 0.1 | 2931 | 0 | 30 | 0 | 8.8 | 1.1 |
| WA | 659 | 8 | 11 | 1.8 | 0.5 | 648 | 5 | 100 | 1 | 12.8 | -2.4 |
| XX | 3337 | 1 | 4 | 1.5 | 0.5 | 3942 | 0 | 100 | 1 | 13.5 | 1.4 |
| N | 700 | 2 | 24 | 2.5 | 0.6 | 639 | 0 | 18 | 0 | 7.9 | 0.7 |
| ADS | 74 | 0 | 1 | 0.7 | 0.0 | 74 | 0 | 1 | 0 | 4.8 | -0.3 |
| US ACAR | 529709 | 0 | 7 | 1.2 | 0.2 | 529341 | 0 | 9 | 0 | 6.4 | 0.7 |

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA FIGURE 3
MAY 1998
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED


0 0 3 2 1 0 1 0 0 0 0 0 0
0 1 2 2 8 8 8 3 3 1 1 0
3 8 11 46 10 6 2 2 3 10 14 14 29 57 77 75 48 22 4 0 12 10 10 7 5 6 6 6 1 1 2 2
21 20 33 75 134 93 78 48 18 7 10 33 100 185 226 253 278 52 14 18 13 6 4 1 6 7 8 4 2 9 8 3 2 14 24
16 69 68 77 119 722 1227 1721 1919 2630 1025 125 102 105 114 125 146 34 252 28 15 2 3 2 7 2 2 2 7 7 1 18 37 81 139 68
5 20 17 37 174 977 2677 3175 3252 2928 523 54 39 68 50 17 14 4 42 7 10 9 12 3 9 0 2 3 7 98 117 95 47
0 61 241 170 43 10 21 99 201 613 125 80 64 37 13 6 2 1 36 4 4 11 10 13 21 20 15 5 6 52 19 19 21 6 8 10
0 4 8 8 8 0 6 34 8 50 93 23 3 2 2 1 2 27 7 1 11 1 6 1 8 18 6 23 1 1 2 2 2 2
5 10 16 6 3 1 0 0 1 55 12 5 0 11 7 1 1 16 8 6 10 2 0 4 1 4 15 39 2 4 0 6 1 0 0
31 37 24 4 0 0 36 8 14 2 3 1 0 0 4 9 13 6 4 3 2 1 4 5 32 43 13 0 0 10
37 17 11 0 0 18 6 12 12 1 0 0 0 3 9 15 1 2 11 5 4 0 2 33 62 45 9 2 8 43
26 13 1 0 0 0 22 7 3 17 0 1 6 15 6 6 5 9 37 85 107 102 70 58
10 2 11 2 5 0 1 2 5 0 0 0 0 0 0 20 29 53 363 211 89 68
0 0 0 0 0 5 2 15 3
0
0

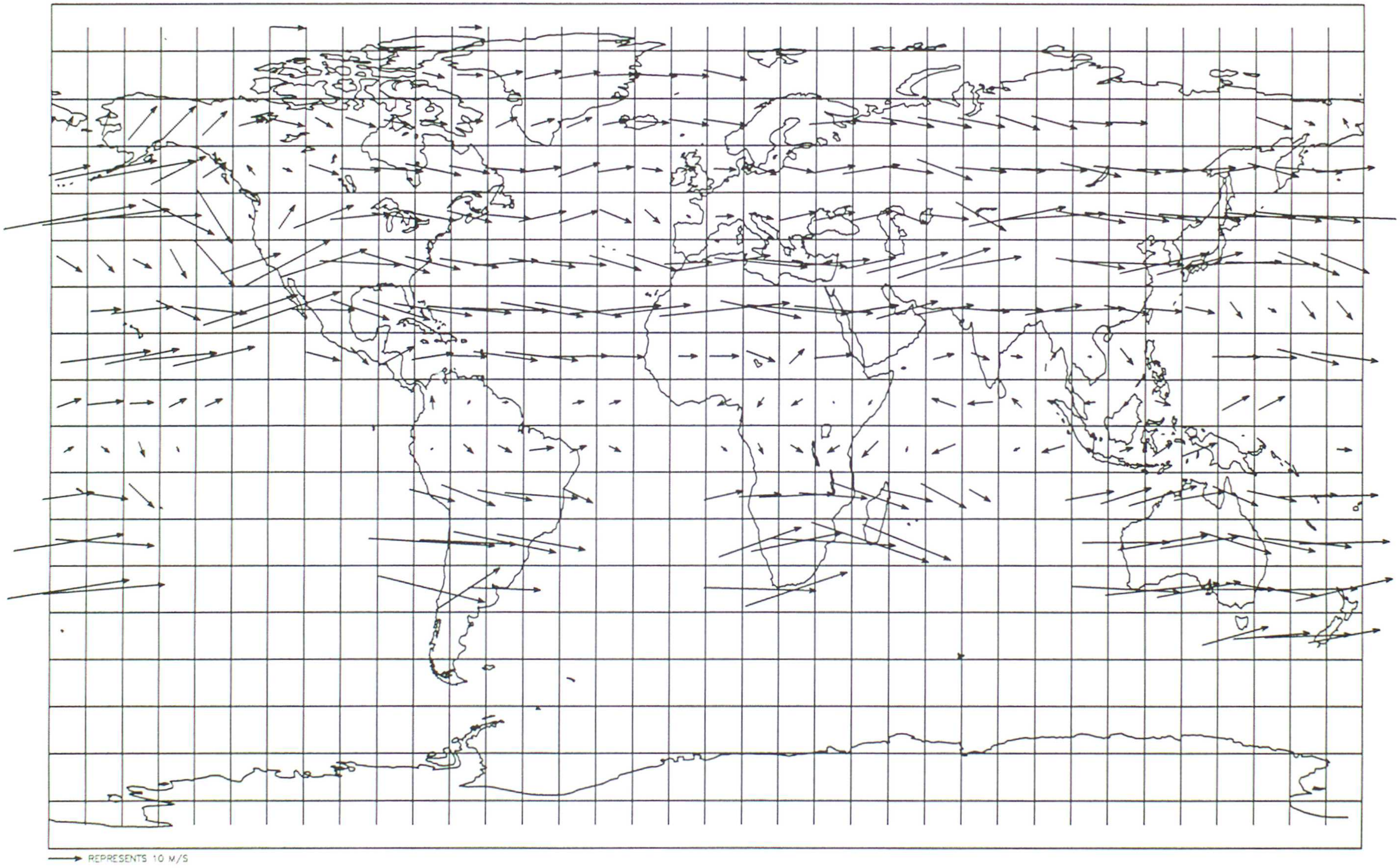
AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA

FIGURE 4

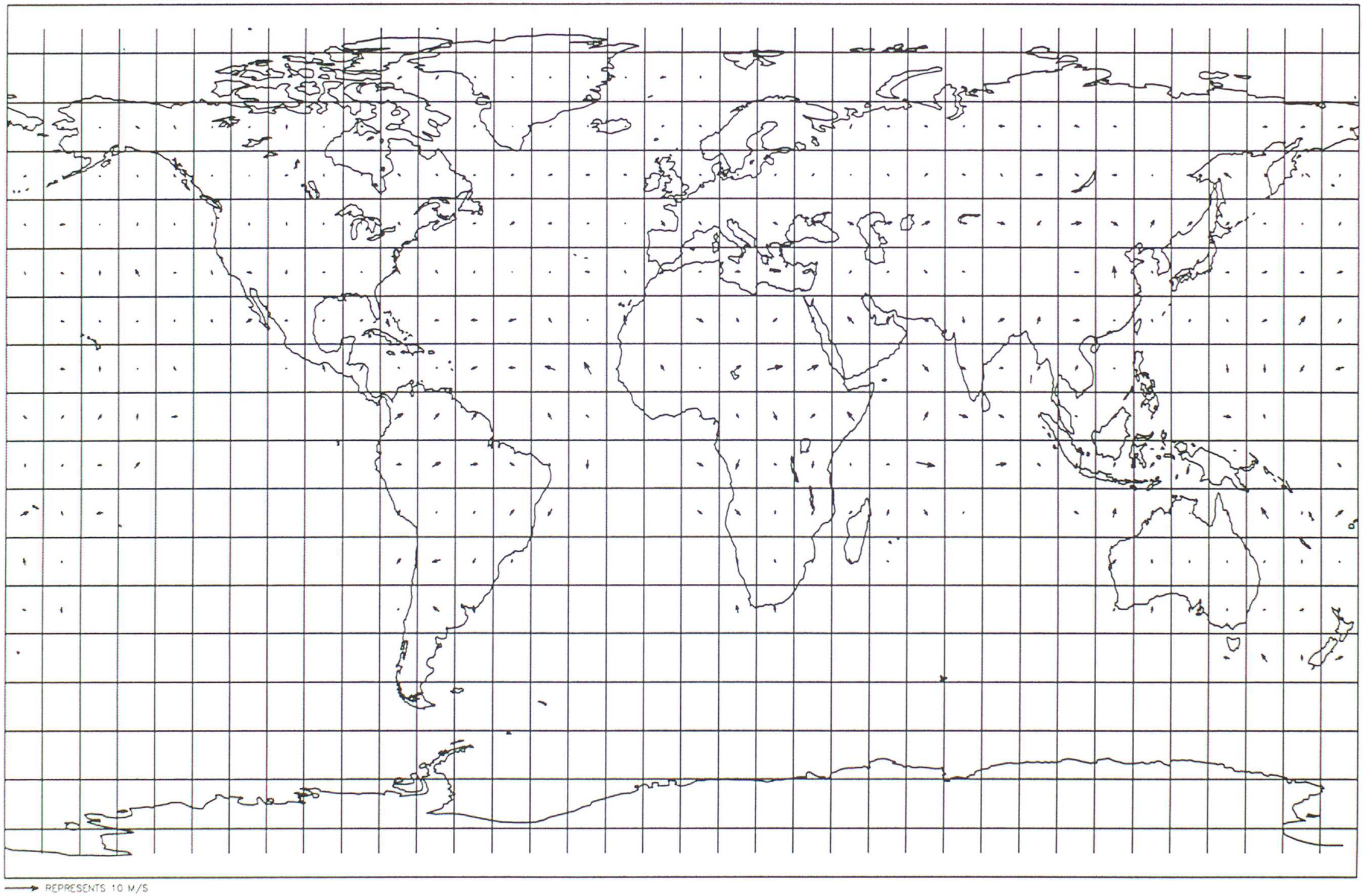
MAY 1998

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT MEAN O–B WINDS BETWEEN 70 AND 500 HPA FIGURE 5
MAY 1998
OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT

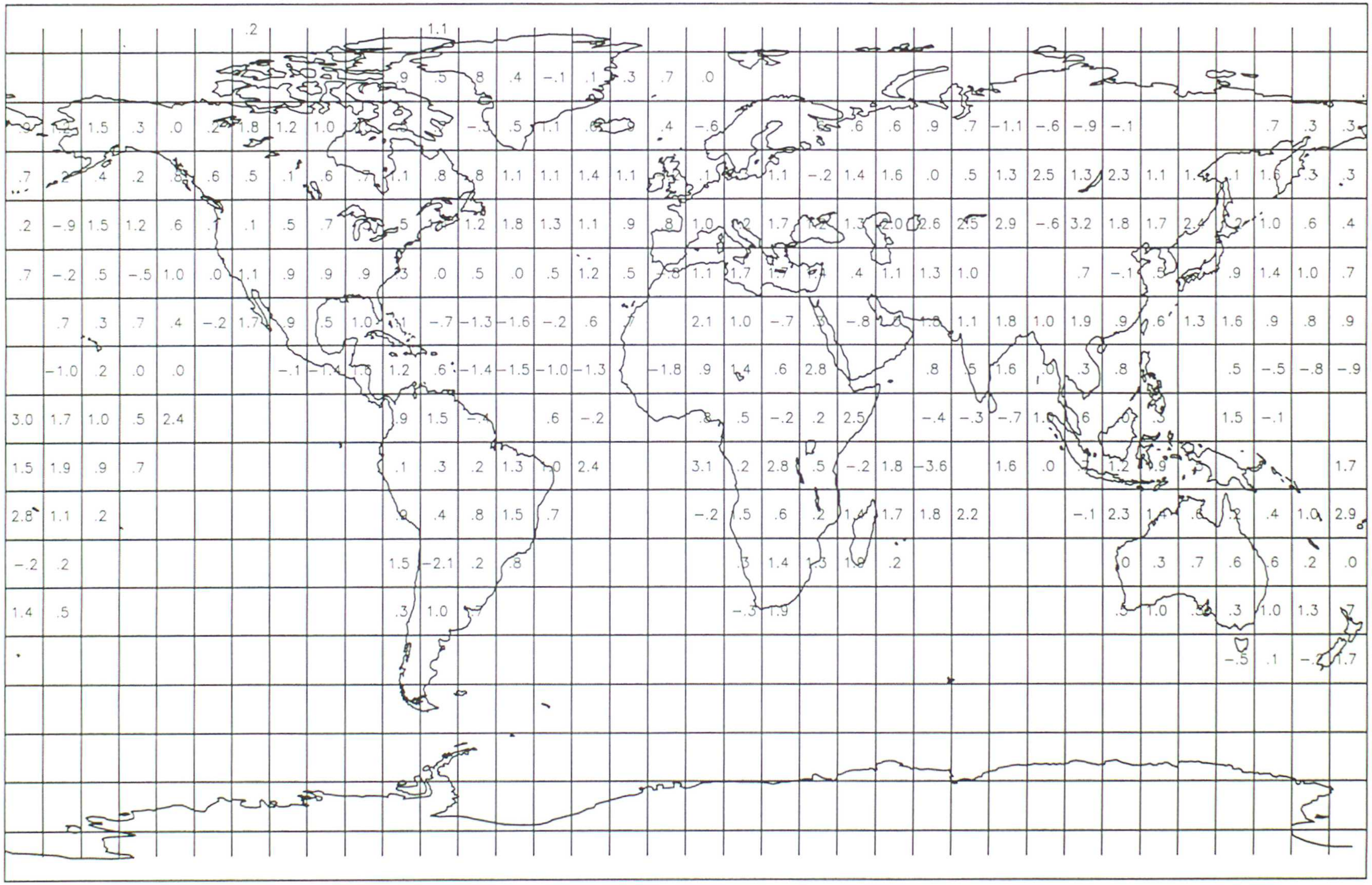


AIRCRAFT : MEAN O–B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6

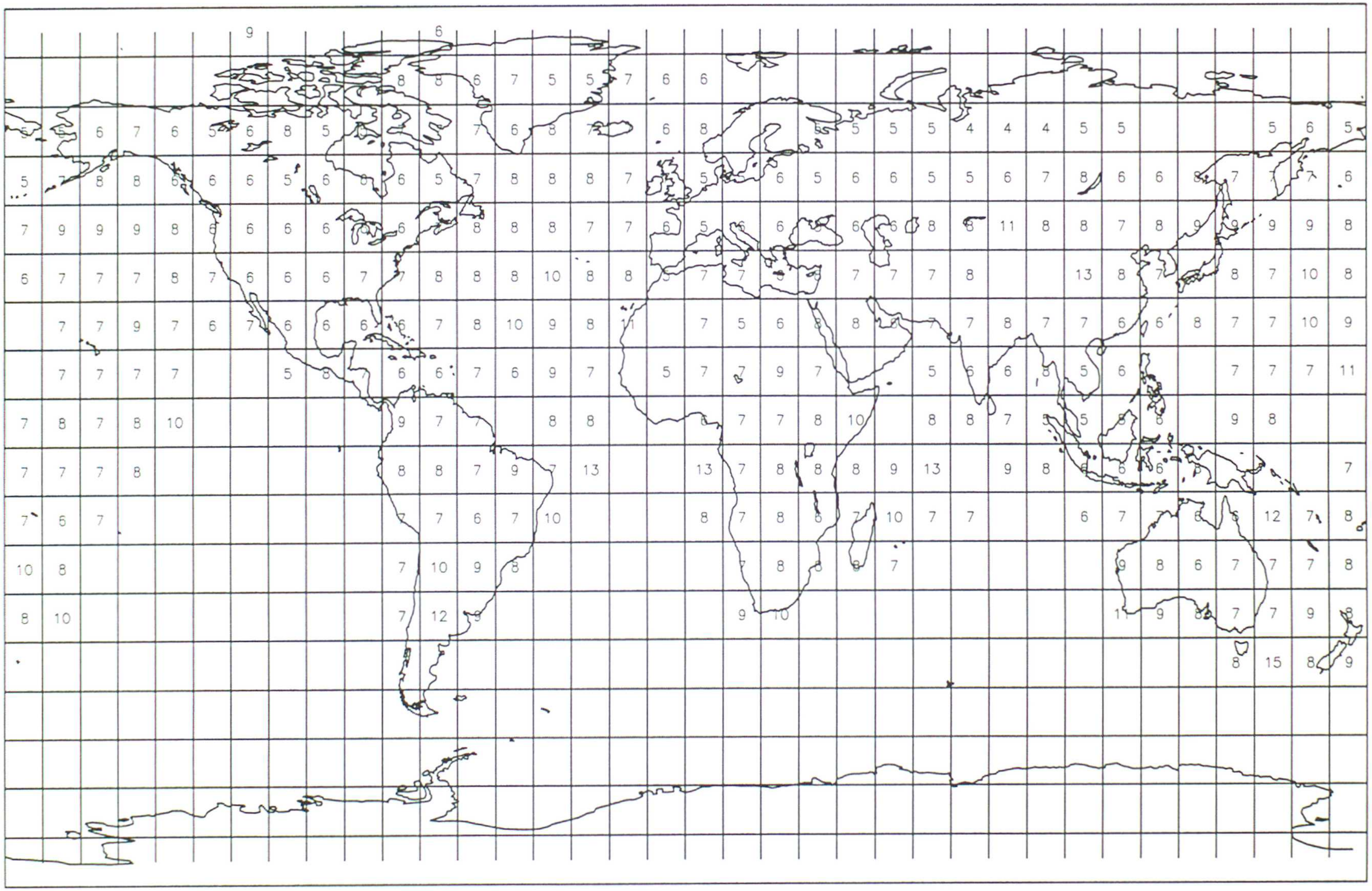
MAY 1998

OBSERVATIONS WITH O–B VECTOR DIFFERENCE > 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


.2 1.1
.9 .5 .8 .4 –.1 .1 .3 .7 .0
1.5 .3 .0 .2 1.8 1.2 1.0 –.3 .5 1.1 .4 –.6 .6 .6 .9 .7 –1.1 –.6 –.9 –.1 .7 .3 .3
.7 .2 .4 .2 .8 .6 .5 .1 .6 .7 1.1 .8 .8 1.1 1.1 1.4 1.1 .1 1.1 –.2 1.4 1.6 .0 .5 1.3 2.5 1.3 2.3 1.1 1.4 .1 1.6 .3 .3
.2 –.9 1.5 1.2 .6 .1 .5 .7 .5 1.2 1.8 1.3 1.1 .9 .8 1.0 .2 1.7 1.3 2.0 2.6 2.5 2.9 –.6 3.2 1.8 1.7 2.4 .2 1.0 .6 .4
.7 –.2 .5 –.5 1.0 .0 1.1 .9 .9 .9 .3 .0 .5 .0 .5 1.2 .5 .8 1.1 1.7 .4 1.1 1.3 1.0 .7 –.1 .5 .9 1.4 1.0 .7
.7 .3 .7 .4 –.2 1.7 .9 .5 1.0 .1 –.7 –1.3 –1.6 –.2 .6 .7 2.1 1.0 –.7 .3 –.8 1.8 1.1 1.8 1.0 1.9 .9 .6 1.3 1.6 .9 .8 .9
–1.0 .2 .0 .0 –.1 –1.4 1.6 1.2 .6 –1.4 –1.5 –1.0 –1.3 –1.8 .9 1.4 .6 2.8 .8 .5 1.6 .0 .3 .8 .5 –.5 –.8 –.9
3.0 1.7 1.0 .5 2.4 .9 1.5 –.4 .6 –.2 .8 .5 –.2 .2 2.5 –.4 –.3 –.7 1.6 .0 .3 1.5 –.1
1.5 1.9 .9 .7 .1 .3 .2 1.3 1.0 2.4 3.1 .2 2.8 .5 –.2 1.8 –3.6 1.6 .0 1.2 .9 1.7
2.8 1.1 .2 .9 .4 .8 1.5 .7 –.2 1.5 .6 .2 1.4 1.7 1.8 2.2 –.1 2.3 1.4 .8 .2 .4 1.0 2.9
–.2 .2 1.5 –2.1 .2 .8 .3 1.4 1.3 1.0 .2 .0 .3 .7 .6 .6 .2 .0
1.4 .5 .3 1.0 .7 –.3 1.9 .5 1.0 .3 .3 1.0 1.3 .7
–.5 .1 –.2 1.7

AIRCRAFT : RMS O–B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
MAY 1998
OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


9 6
8 8 6 7 5 5 7 6 6
5 5 6 7 6 5 6 8 5 6 7 6 8 7 6 8 5 5 5 5 4 4 4 5 5 5 6 5
5 7 8 8 6 6 6 5 6 8 6 5 7 8 8 8 7 5 5 6 5 6 6 5 5 6 7 8 6 6 8 7 7 7 6
7 9 9 9 8 6 6 6 6 6 6 7 8 8 8 7 7 6 5 6 6 6 6 8 8 11 8 8 7 8 9 9 9 9 8
6 7 7 7 8 7 6 6 6 7 7 8 8 8 10 8 8 5 7 7 5 6 7 7 7 8 13 8 7 8 7 10 8
7 7 9 7 6 7 6 6 6 6 7 8 10 9 8 11 7 5 6 8 8 8 7 7 8 7 7 6 6 8 7 7 10 9
7 7 7 7 5 8 7 6 6 7 6 9 7 5 7 7 9 7 5 6 6 8 5 6 7 7 7 11
7 8 7 8 10 9 7 7 8 8 6 7 7 8 10 8 8 7 5 5 8 6 9 8
7 7 7 8 8 8 7 9 7 13 13 7 8 8 8 9 13 9 8 6 6 6 8 7
7 6 7 7 7 6 7 10 8 7 8 6 7 10 7 7 6 7 7 6 6 12 7 8
10 8 7 10 9 8 7 8 8 8 7 9 8 6 7 7 7 8
8 10 7 12 9 9 10 11 9 8 7 7 9 8
8 15 8 9

# TABLE 5

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

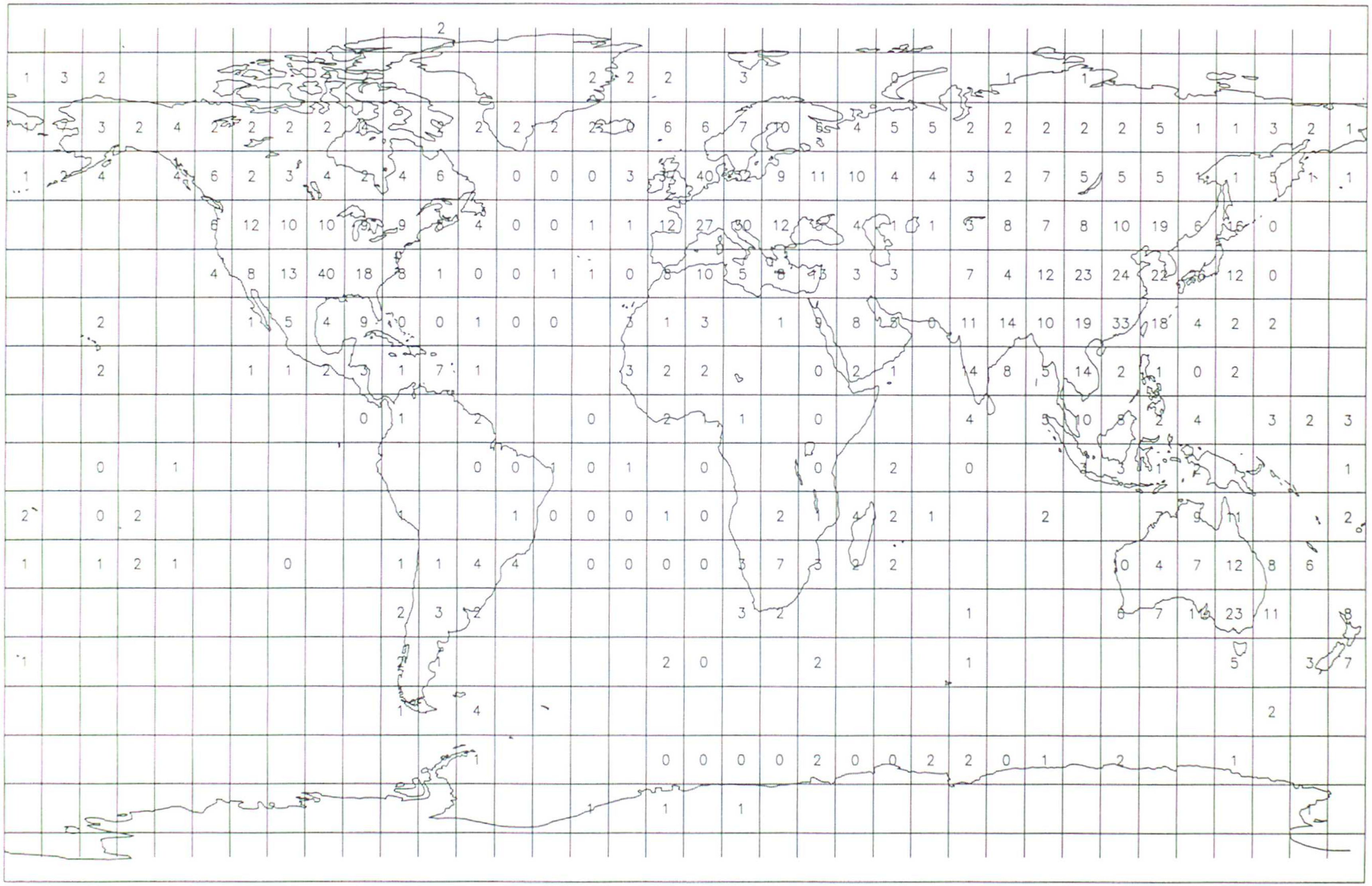
**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from Bracknell global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 1000.0 - 30.0 hPa |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT IN metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown duringperiod. |
| | :% REJ | :Percentage of observations rejected by quality control at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| | :NUM LEVELS | :Number of levels satisfying selection criteria. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.1 | |
| **SELECTION CRITERIA** | : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS. | |

**ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS**

| WMO IDENT | OBS TIME | ELM | LEV | LAT/LONG | NUM OBS | NUM GROSS | SD | BIAS | RMS | NUM LEVELS |
|---|---|---|---|---|---|---|---|---|---|---|
| 25563 | 00 | Z | 250 | 65/ 178 | 22 | 0 | 40.3 | 114.7 | 121.6 | 6 |
| 33658 | 00 | Z | 100 | 48/ 26 | 13 | 0 | 21.7 | 152.4 | 153.9 | 5 |
| 41780 | 00 | Z | 250 | 25/ 67 | 11 | 0 | 63.9 | 43.1 | 77.1 | 4 |
| 42027 | 00 | Z | 100 | 34/ 75 | 8 | 2 | 106.7 | -141.6 | 177.3 | 8 |
| 42027 | 12 | Z | 150 | 34/ 75 | 12 | 2 | 100.3 | -104.3 | 144.7 | 6 |
| 42101 | 12 | Z | 200 | 30/ 76 | 16 | 2 | 58.4 | 108.3 | 123.0 | 7 |
| 42182 | 12 | Z | 400 | 29/ 77 | 29 | 1 | 49.7 | 34.4 | 60.5 | 6 |
| 42314 | 00 | Z | 200 | 27/ 95 | 14 | 0 | 67.0 | 65.0 | 93.3 | 7 |
| 42339 | 00 | Z | 300 | 26/ 73 | 17 | 1 | 77.2 | -27.5 | 82.0 | 6 |
| 42339 | 12 | Z | 150 | 26/ 73 | 14 | 0 | 95.2 | 29.7 | 99.7 | 5 |
| 42369 | 12 | Z | 150 | 27/ 81 | 16 | 0 | 93.5 | 67.9 | 115.5 | 7 |
| 42397 | 00 | Z | 250 | 27/ 88 | 21 | 0 | 89.4 | -4.1 | 89.4 | 7 |
| 42492 | 00 | Z | 250 | 26/ 85 | 27 | 0 | 60.2 | -90.9 | 109.0 | 7 |
| 42492 | 12 | Z | 400 | 26/ 85 | 24 | 0 | 55.9 | -7.8 | 56.5 | 4 |
| 42647 | 00 | Z | 150 | 23/ 73 | 16 | 0 | 99.0 | -35.8 | 105.2 | 4 |
| 42647 | 12 | Z | 150 | 23/ 73 | 20 | 0 | 77.3 | 119.9 | 142.7 | 8 |
| 42667 | 12 | Z | 150 | 23/ 77 | 12 | 0 | 84.6 | 88.8 | 122.7 | 6 |
| 42701 | 00 | Z | 250 | 23/ 85 | 22 | 0 | 74.6 | 14.3 | 75.9 | 6 |
| 42701 | 12 | Z | 150 | 23/ 85 | 14 | 0 | 95.8 | 70.0 | 118.6 | 5 |
| 42724 | 00 | Z | 200 | 24/ 91 | 10 | 1 | 126.7 | 5.2 | 126.8 | 6 |
| 42724 | 12 | Z | 500 | 24/ 91 | 17 | 0 | 55.5 | 28.8 | 62.5 | 7 |
| 42867 | 00 | Z | 150 | 21/ 79 | 28 | 0 | 95.9 | 25.4 | 99.2 | 5 |
| 42867 | 12 | Z | 150 | 21/ 79 | 17 | 0 | 111.5 | 13.9 | 112.4 | 7 |
| 42971 | 00 | Z | 100 | 20/ 86 | 26 | 0 | 110.0 | 53.7 | 122.4 | 6 |
| 42971 | 12 | Z | 200 | 20/ 86 | 19 | 0 | 75.0 | 58.5 | 95.1 | 6 |
| 43003 | 12 | Z | 150 | 19/ 73 | 18 | 1 | 48.4 | 159.3 | 166.5 | 8 |
| 43014 | 00 | Z | 150 | 20/ 75 | 12 | 10 | 137.8 | -175.8 | 223.4 | 7 |
| 43014 | 12 | Z | 150 | 20/ 75 | 9 | 8 | 58.5 | -186.7 | 195.6 | 6 |
| 43128 | 00 | Z | 200 | 17/ 78 | 26 | 0 | 72.6 | -44.7 | 85.3 | 5 |
| 43128 | 12 | Z | 100 | 17/ 78 | 19 | 0 | 102.3 | 111.9 | 151.7 | 5 |
| 43185 | 00 | Z | 200 | 16/ 81 | 28 | 0 | 101.8 | 8.0 | 102.1 | 7 |
| 43185 | 12 | Z | 150 | 16/ 81 | 25 | 1 | 97.1 | 56.9 | 112.5 | 7 |
| 43192 | 00 | Z | 200 | 15/ 74 | 25 | 0 | 99.9 | -36.5 | 106.4 | 7 |
| 43279 | 12 | Z | 100 | 13/ 80 | 23 | 1 | 80.5 | 109.9 | 136.2 | 7 |
| 43285 | 12 | Z | 100 | 13/ 75 | 15 | 0 | 90.4 | 142.0 | 168.3 | 8 |
| 43295 | 00 | Z | 100 | 13/ 78 | 18 | 1 | 110.4 | 79.9 | 136.3 | 4 |
| 43295 | 12 | Z | 150 | 13/ 78 | 18 | 1 | 62.4 | 116.4 | 132.1 | 7 |
| 43333 | 00 | Z | 250 | 12/ 93 | 24 | 0 | 60.2 | -45.1 | 75.2 | 5 |
| 43333 | 12 | Z | 150 | 12/ 93 | 19 | 0 | 107.5 | -14.3 | 108.5 | 4 |
| 43353 | 00 | Z | 100 | 10/ 76 | 13 | 0 | 116.4 | -77.1 | 139.6 | 5 |
| 53463 | 00 | Z | 200 | 41/ 112 | 30 | 0 | 38.5 | 78.3 | 87.2 | 4 |
| 53772 | 00 | Z | 200 | 38/ 113 | 31 | 0 | 25.5 | 88.1 | 91.7 | 5 |
| 54337 | 00 | Z | 250 | 41/ 121 | 29 | 0 | 43.4 | 61.3 | 75.1 | 5 |
| 54497 | 00 | Z | 200 | 40/ 124 | 30 | 0 | 65.4 | 85.1 | 107.3 | 5 |
| 54497 | 12 | Z | 200 | 40/ 124 | 24 | 1 | 53.7 | 72.8 | 90.5 | 4 |
| 56080 | 12 | Z | 1000 | 35/ 103 | 17 | 13 | 17.6 | 73.9 | 76.0 | 4 |
| 58203 | 12 | Z | 200 | 33/ 116 | 29 | 0 | 30.4 | 75.9 | 81.8 | 4 |
| 58424 | 00 | Z | 100 | 31/ 117 | 30 | 0 | 25.1 | 126.6 | 129.0 | 4 |
| 62337 | 12 | Z | 150 | 31/ 34 | 15 | 5 | 80.4 | 83.0 | 115.6 | 7 |
| 76458 | 00 | Z | 100 | 23/-106 | 20 | 0 | 48.5 | 117.7 | 127.3 | 4 |
| 84628 | 12 | Z | 850 | -12/ -77 | 26 | 0 | 11.9 | -73.5 | 74.5 | 8 |
| 89009 | 00 | Z | 1000 | -90/ 0 | 1 | 22 | 0.0 | 45.0 | 45.0 | 8 |
| 89022 | 12 | Z | 700 | -75/ -27 | 21 | 5 | 41.6 | 0.6 | 41.6 | 6 |
| 89055 | 12 | Z | 1000 | -64/ -57 | 10 | 0 | 26.1 | -26.2 | 37.0 | 6 |
| 89664 | 00 | Z | 250 | -78/ 167 | 19 | 2 | 82.6 | 118.5 | 144.4 | 10 |
| 96237 | 00 | Z | 150 | -2/ 106 | 11 | 0 | 43.4 | -127.7 | 134.9 | 6 |
| 97560 | 00 | Z | 250 | -1/ 136 | 25 | 0 | 57.6 | -56.4 | 80.6 | 7 |

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – MAY 1998 FIGURE 8
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1426



## TABLE 6

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for radiosonde TEMPs.

**Area monitored** :90°N - 90°S, 180°W - 180°E.

**Standard of comparison** :Background field from Bracknell global model.

**Observation times** :00 UTC and 12 UTC.

**Level(s) monitored** :Standard levels between 1000.0 - 100.0 hPa

**Element monitored** :VECTOR WIND in $m\ s^{-1}$

**Parameters monitored**

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

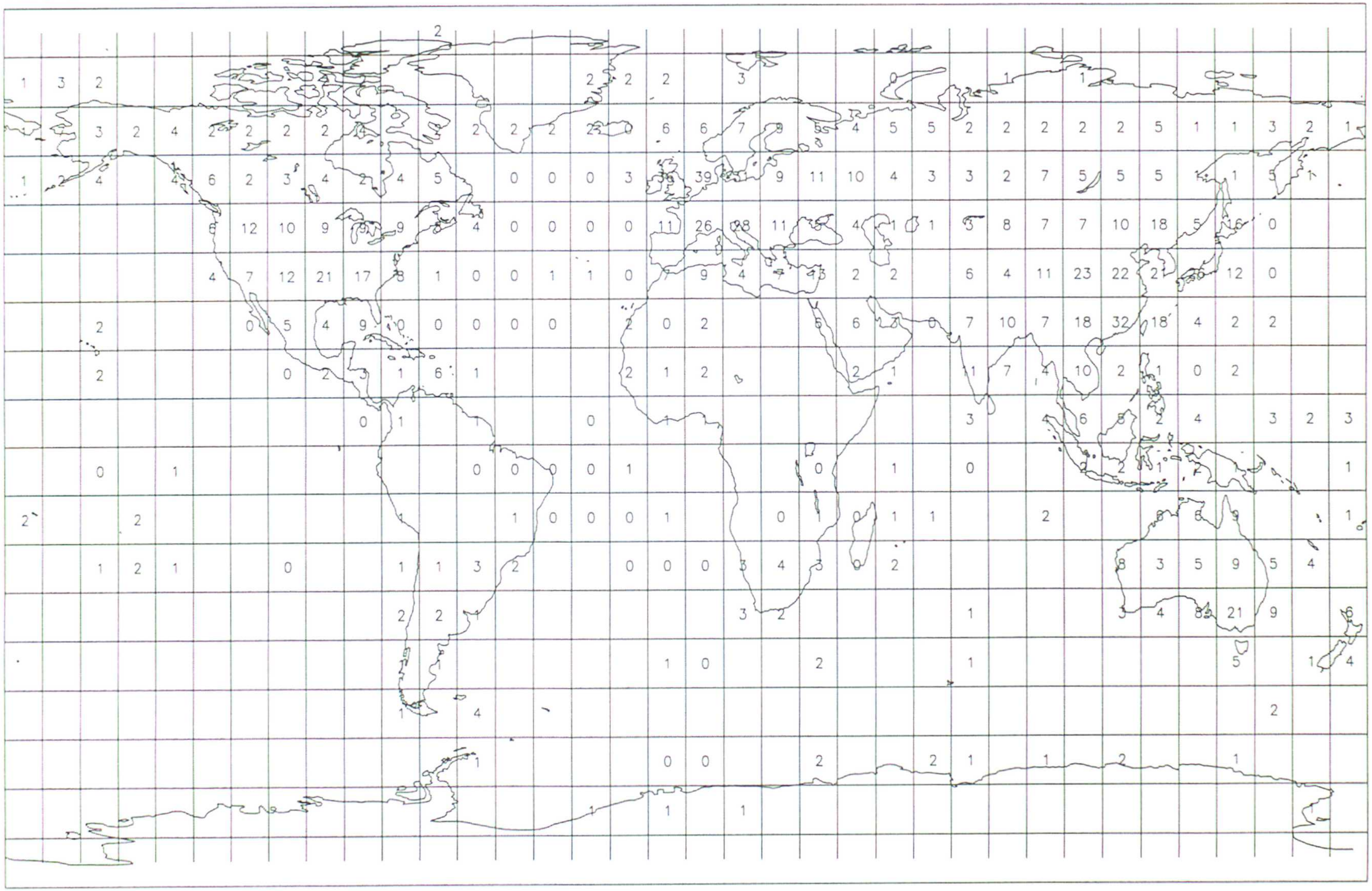
**GROSS ERROR LIMITS** :Defined in Appendix I.2

**SELECTION CRITERIA** : $\geq$ 10 observations and $\geq$ 15 $m\ s^{-1}$ RMS vector wind.

**ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN**

| WMO IDENT | OBS TIME | ELM | LEV | LAT/LONG | NUM OBS | NUM GROSS | % REJ | UBIAS | VBIAS | RMS | LEVELS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 42361 | 00 | V | 250 | 26/ 78 | 14 | 0 | 7 | 8.3 | 7.5 | 15.5 | 1 |
| 42410 | 00 | V | 200 | 26/ 92 | 17 | 0 | 11 | -9.1 | 3.8 | 16.9 | 1 |
| 43014 | 12 | V | 200 | 20/ 75 | 17 | 0 | 23 | 5.0 | 3.6 | 17.2 | 1 |
| 60630 | 12 | V | 150 | 27/ 2 | 13 | 0 | 15 | 9.7 | -2.8 | 20.0 | 2 |
| 76692 | 12 | V | 250 | 19/ -96 | 16 | 0 | 12 | -6.8 | 7.8 | 16.4 | 2 |
| 78397 | 12 | V | 150 | 18/ -77 | 14 | 0 | 21 | 8.0 | -8.3 | 16.3 | 1 |
| 83612 | 12 | V | 250 | -20/ -55 | 20 | 0 | 25 | -1.1 | 6.9 | 16.5 | 1 |
| 89009 | 00 | V | 250 | -90/ 0 | 23 | 0 | 86 | 5.9 | 8.0 | 22.6 | 4 |

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – MAY 1998 FIGURE 9
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1256


2
1 3 2 2 2 2 3 1 1
3 2 4 2 2 2 2 2 2 2 2 0 6 6 7 8 5 4 5 5 2 2 2 2 2 5 1 1 3 2 1
1 2 4 4 6 2 3 4 2 4 5 0 0 0 3 39 39 9 11 10 4 3 3 2 7 5 5 5 1 1 5 1
6 12 10 9 8 9 4 0 0 0 0 11 26 28 11 5 4 1 0 1 3 8 7 7 10 18 5 16 0
4 7 12 21 17 8 1 0 0 1 1 0 7 9 4 7 13 2 2 6 4 11 23 22 21 20 12 0
2 0 5 4 9 10 0 0 0 0 2 0 2 5 6 0 0 7 10 7 18 32 18 4 2 2
2 0 2 3 1 6 1 2 1 2 2 1 11 7 4 10 2 1 0 2
0 1 1 0 1 3 4 6 5 2 4 3 2 3
0 1 0 0 0 0 1 0 1 0 2 1 1 1
2 2 1 1 0 0 0 1 0 1 0 1 1 2 6 6 9 1 1
1 2 1 0 1 1 3 2 0 0 0 3 4 3 0 2 8 3 5 9 5 4
2 2 1 3 2 1 3 4 83 21 9 6
1 1 0 2 1 5 1 4
1 4 2
1 0 0 2 2 1 1 2 1
1 1 1

# TABLE 7

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | :Background field from Bracknell global model. |
| **Observation times** | :00 UTC and 12 UTC. |
| **Level(s) monitored** | :Standard levels between 500.0 - 150.0 hPa |
| **Element monitored** | :WIND DIRECTION in degrees |

**Parameters monitored**

| | |
|---|---|
| :NUM OBS | :Average number of observations at all levels. |
| :BIAS | :Mean difference of observations from background values from all levels. |
| :MAX SPREAD | :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels |
| :SD | :SD of difference of observations from background values at all levels. |

**SELECTION CRITERIA** :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

| WMO IDENT | OBS TIME | ELM | LAT/LONG | NUM OBS | BIAS | MAX SPREAD | SD |
|---|---|---|---|---|---|---|---|
| 42339 | 00 | DD | 26/ 73 | 13 | 15.1 | 8.9 | 17.6 |
| 42339 | 12 | DD | 26/ 73 | 12 | 20.0 | 7.8 | 21.2 |
| 42361 | 12 | DD | 26/ 78 | 8 | -11.5 | 8.9 | 12.3 |
| 44288 | 12 | DD | 46/ 103 | 23 | -13.0 | 8.5 | 19.7 |
| 59134 | 12 | DD | 24/ 118 | 27 | 10.2 | 6.8 | 15.6 |
| 60360 | 12 | DD | 37/ 8 | 20 | 11.9 | 7.0 | 16.2 |
| 60571 | 00 | DD | 32/ -2 | 9 | 11.7 | 6.4 | 10.2 |
| 60571 | 12 | DD | 32/ -2 | 15 | 11.2 | 3.8 | 8.6 |
| 62337 | 00 | DD | 31/ 34 | 27 | -18.4 | 3.8 | 13.0 |
| 62337 | 12 | DD | 31/ 34 | 23 | -19.0 | 4.8 | 11.8 |
| 76458 | 00 | DD | 23/-106 | 20 | -12.2 | 6.1 | 22.2 |
| 91217 | 00 | DD | 14/ 145 | 20 | -14.8 | 6.5 | 17.1 |

# MONITORING OF SATELLITE WINDS

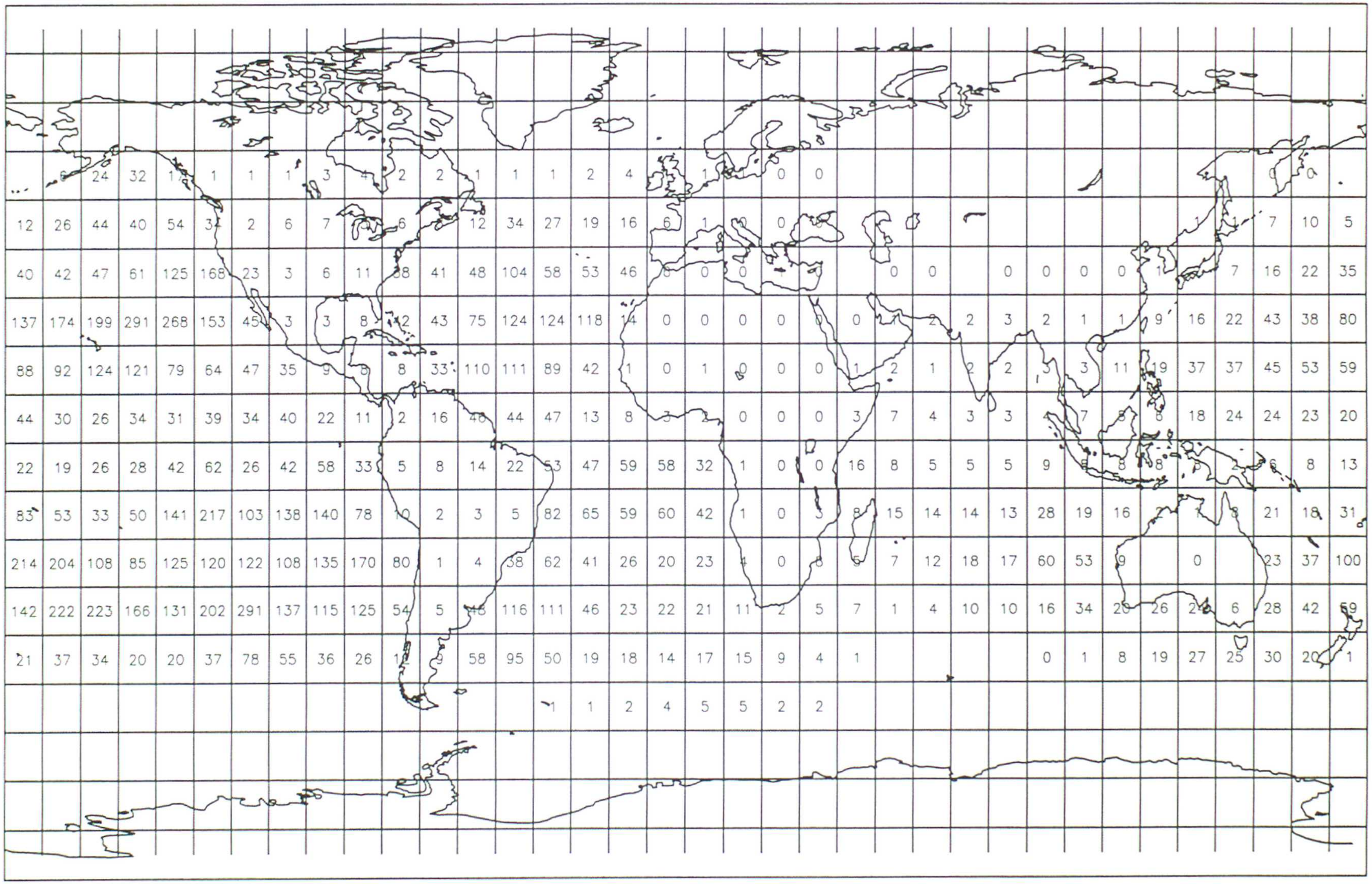
## MONITORING CENTRE: BRACKNELL

## MONTH: May, 1998

### Monitoring procedures

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from GOES, METEOSAT, GMS, INSAT. |
| **Standard of comparison** | :Background field from Bracknell global model. |
| **Selection Criteria** | :number of observations > 10. |
| **Data Extracted** | :Layer 701 - 1000 hPa<br>401 - 700 hPa<br>101 - 400 hPa |
| | :Mean wind |
| | :Mean observation minus background vector wind differences |
| | :Mean observation minus background speed differences |
| | :RMS of observation minus background vector differences |

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
MAY 1998


6 24 32 1 1 1 1 3 4 2 2 1 1 1 2 4 1 1 0 0 0 0
12 26 44 40 54 34 2 6 7 6 12 34 27 19 16 6 1 0 0 0 1 1 7 10 5
40 42 47 61 125 168 23 3 6 11 38 41 48 104 58 53 46 0 0 0 1 0 0 0 0 0 0 0 1 7 16 22 35
137 174 199 291 268 153 45 3 3 8 12 43 75 124 124 118 14 0 0 0 0 0 0 1 2 2 3 2 1 1 9 16 22 43 38 80
88 92 124 121 79 64 47 35 9 8 8 33 110 111 89 42 1 0 1 0 0 0 1 2 1 2 2 3 3 11 19 37 37 45 53 59
44 30 26 34 31 39 34 40 22 11 2 16 46 44 47 13 8 3 2 0 0 0 3 7 4 3 3 4 7 8 6 18 24 24 23 20
22 19 26 28 42 62 26 42 58 33 5 8 14 22 53 47 59 58 32 1 0 0 16 8 5 5 5 9 8 8 8 5 2 6 8 13
83 53 33 50 141 217 103 138 140 78 10 2 3 5 82 65 59 60 42 1 0 3 8 15 14 14 13 28 19 16 2 1 8 21 18 31
214 204 108 85 125 120 122 108 135 170 80 1 4 38 62 41 26 20 23 4 0 8 5 7 12 18 17 60 53 9 0 23 37 100
142 222 223 166 131 202 291 137 115 125 54 5 48 116 111 46 23 22 21 11 2 5 7 1 4 10 10 16 34 20 26 24 6 28 42 59
21 37 34 20 20 37 78 55 36 26 12 9 58 95 50 19 18 14 17 15 9 4 1 0 1 8 19 27 25 30 20 1
1 1 2 4 5 5 2 2

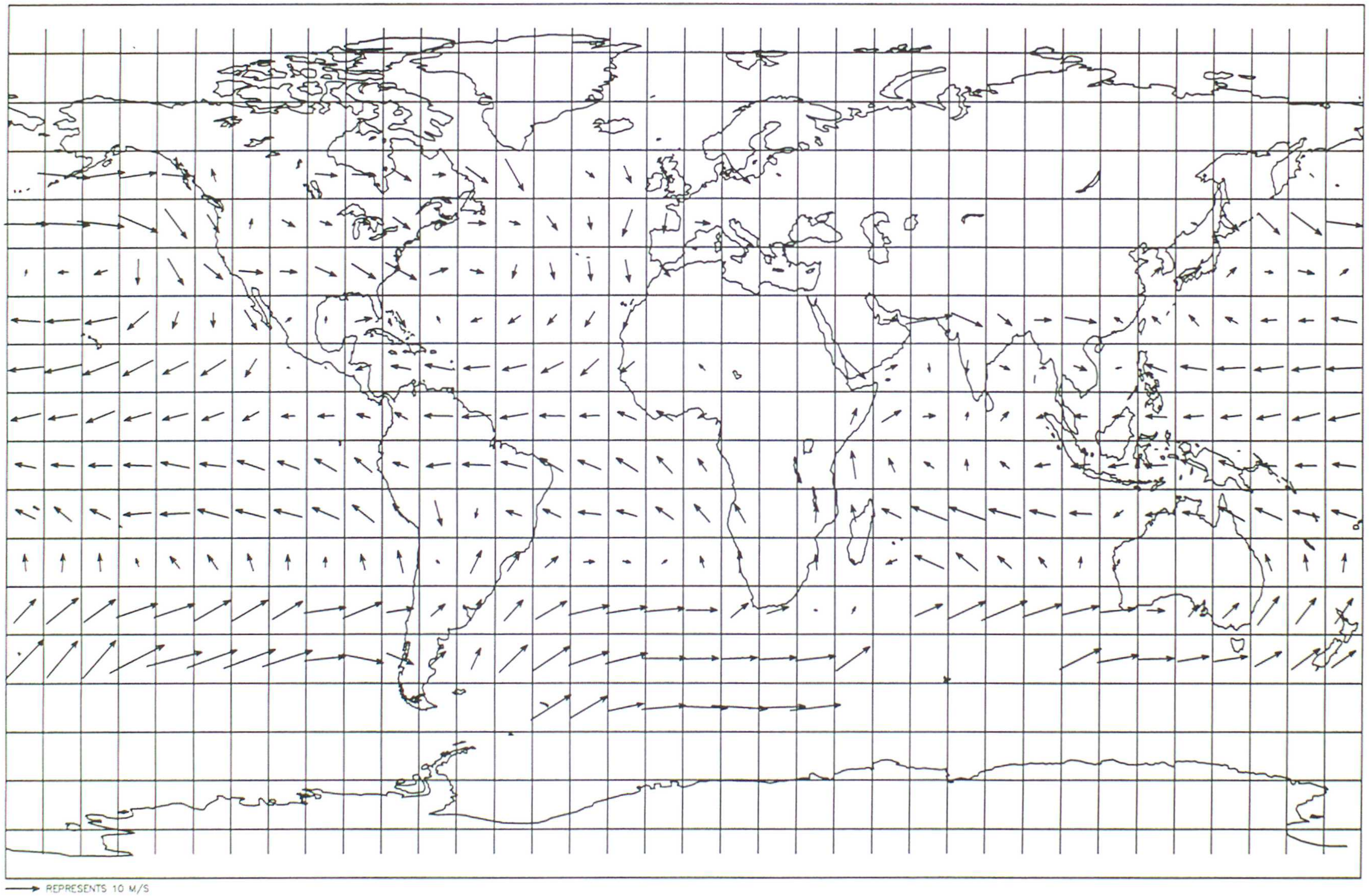
SATOB VECTOR MEAN WINDS BETWEEN 701–1000 HPA

FIGURE 11

MAY 1998

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 10 M/S

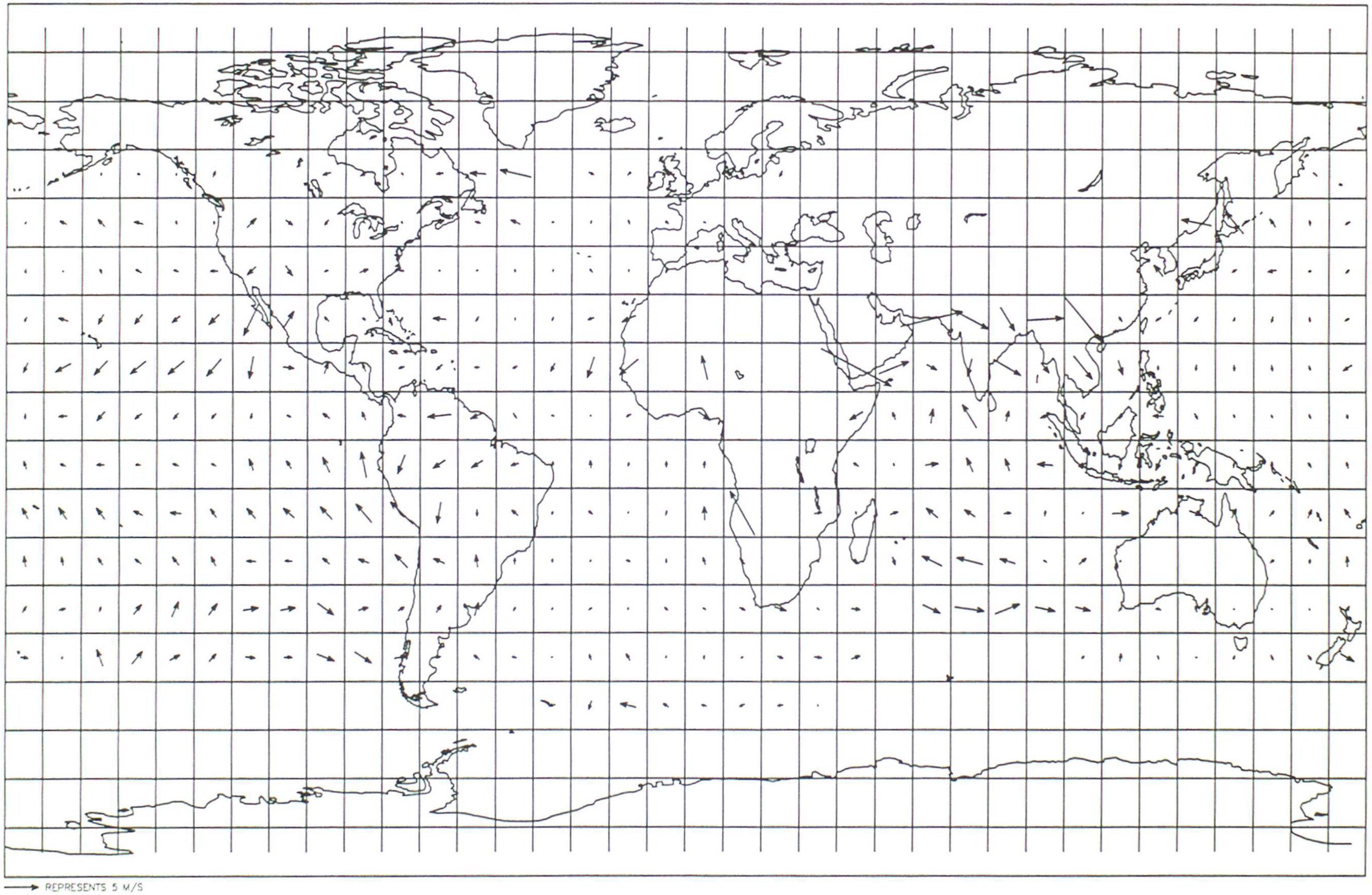
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

FIGURE 12

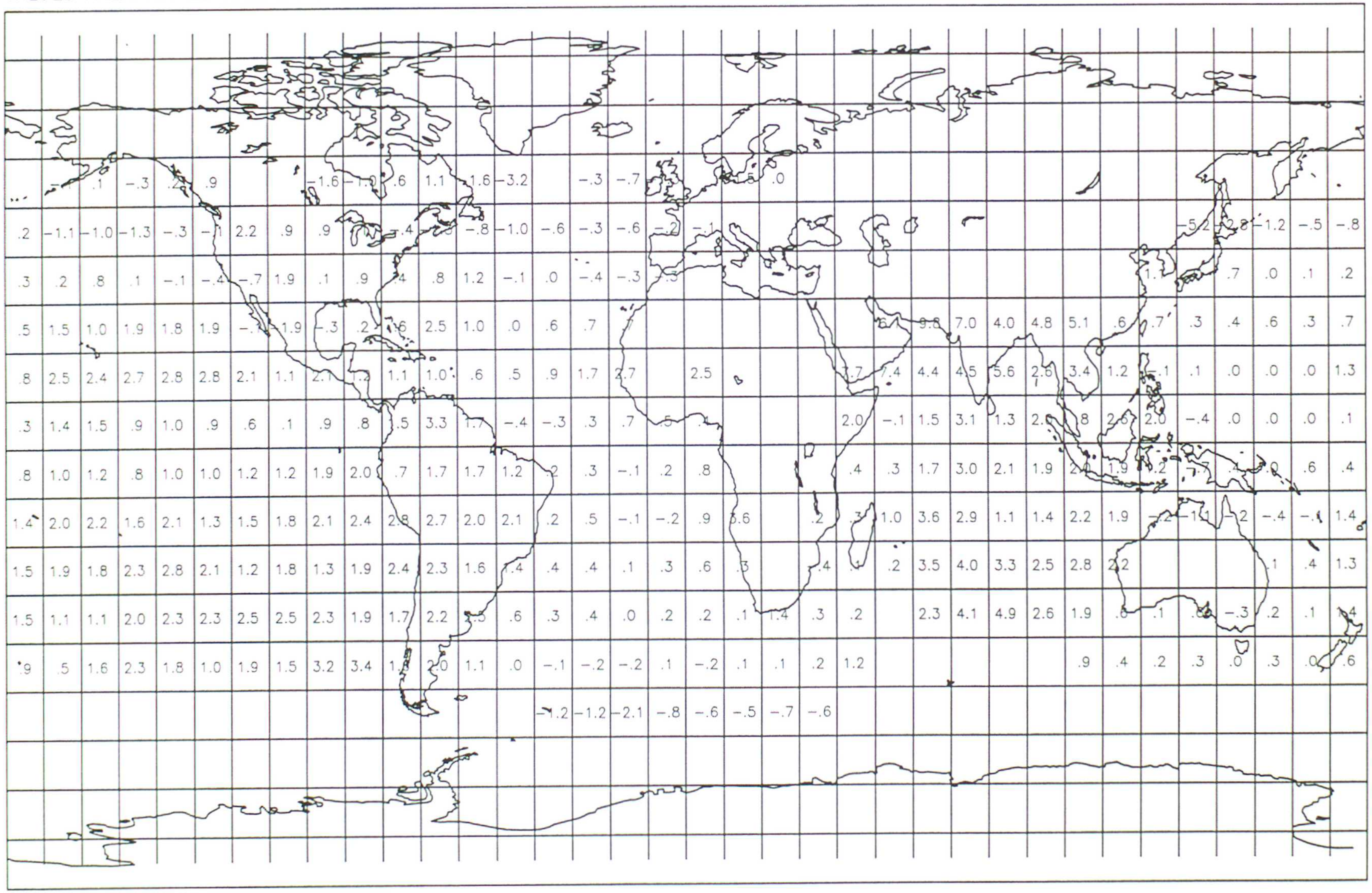
MAY 1998

ALL OBSERVATIONS

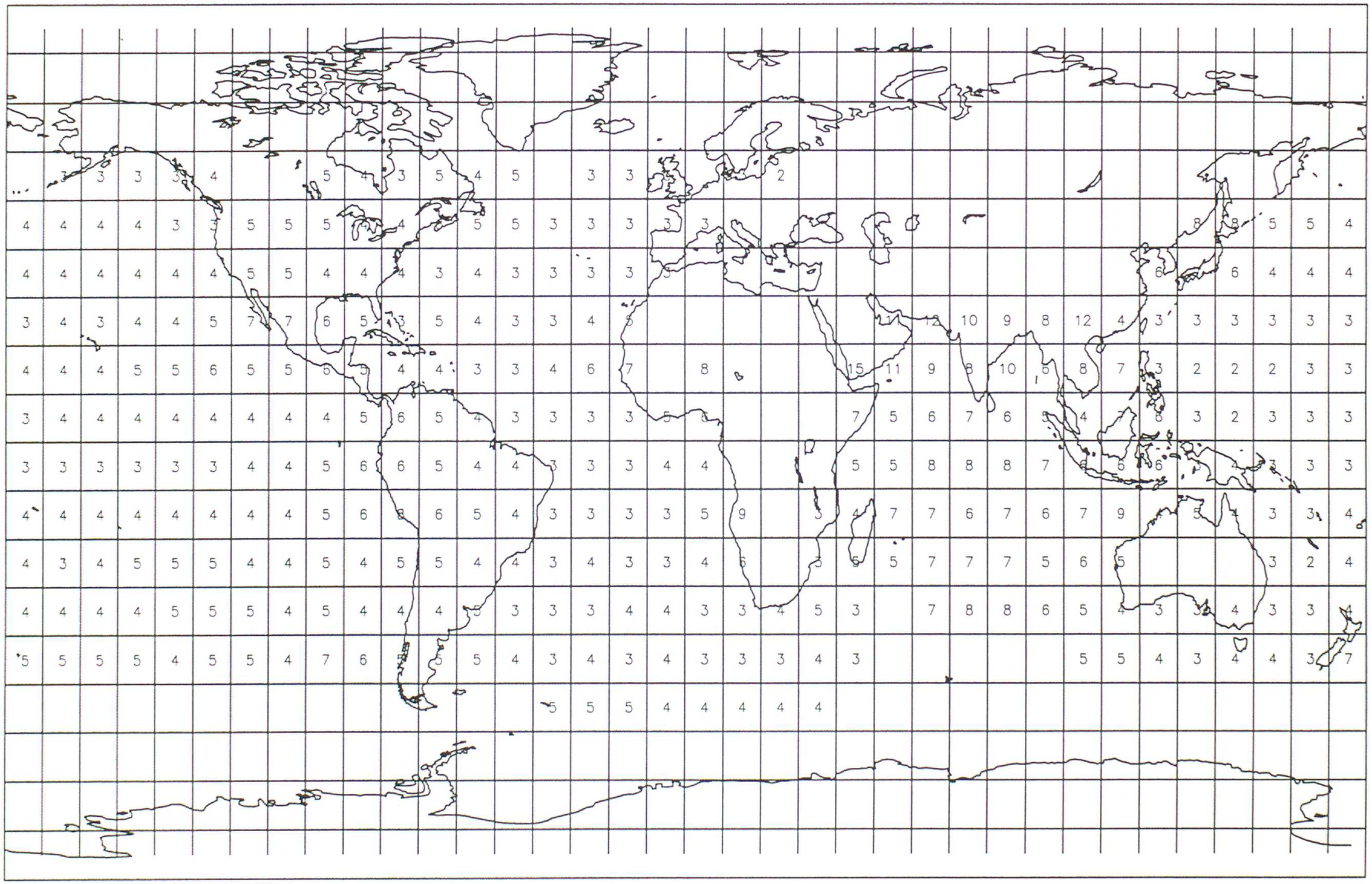
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

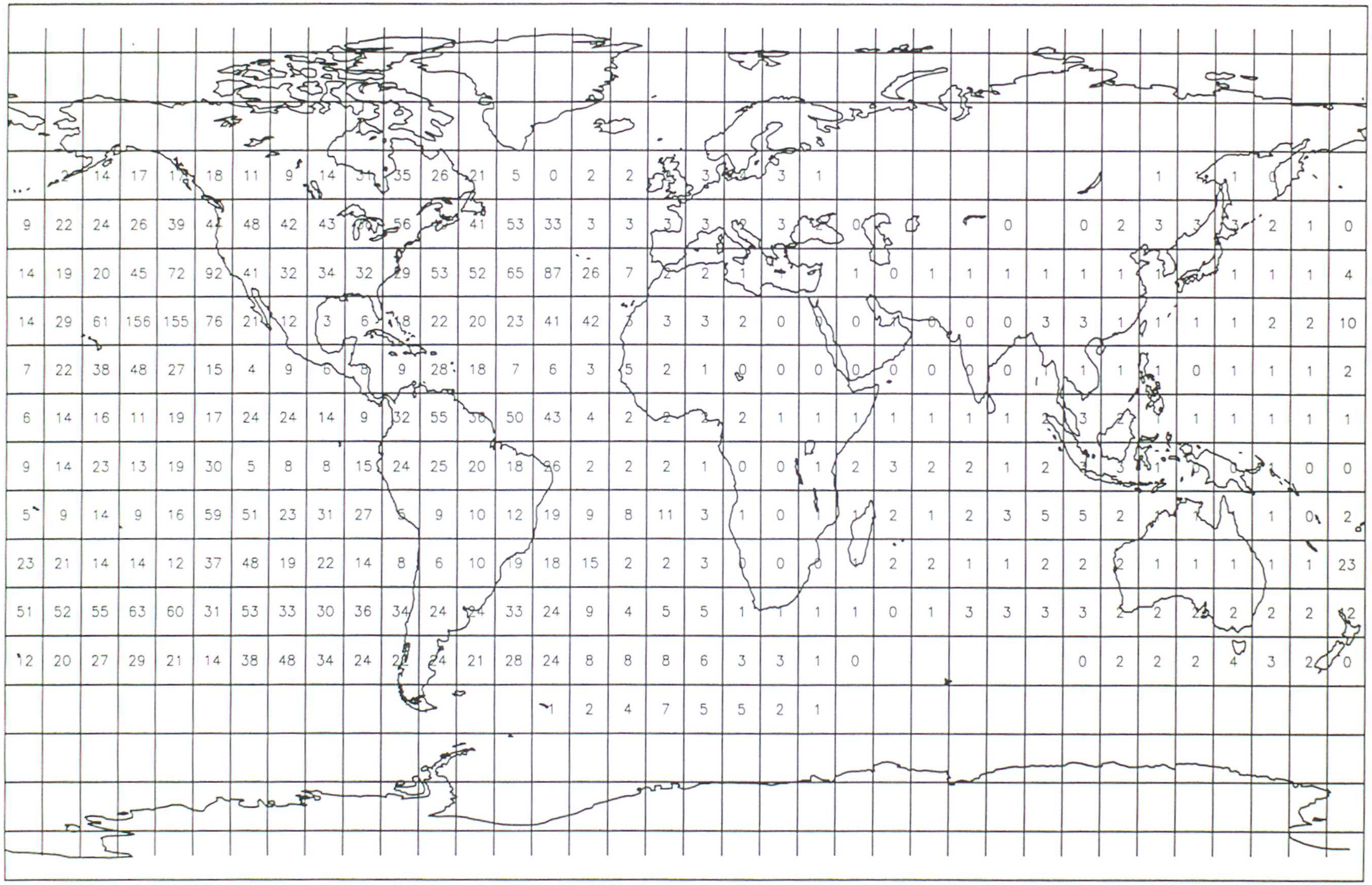
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
MAY 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-.1 .1 -.3 .2 .9 -1.6 -1.0 .6 1.1 1.6 -3.2 -.3 -.7 .5 .0
.2 -1.1 -1.0 -1.3 -.3 -.1 2.2 .9 .9 .4 .5 -.8 -1.0 -.6 -.3 -.6 -.2 -.1 -5.2 -2.8 -1.2 -.5 -.8
.3 .2 .8 .1 -.1 -.4 -.7 1.9 .1 .9 .4 .8 1.2 -.1 .0 -.4 -.3 .3 1.1 .7 .0 .1 .2
.5 1.5 1.0 1.9 1.8 1.9 -.1 1.9 -.3 .2 .6 2.5 1.0 .0 .6 .7 .7 6.1 9.8 7.0 4.0 4.8 5.1 .6 .7 .3 .4 .6 .3 .7
.8 2.5 2.4 2.7 2.8 2.8 2.1 1.1 2.1 1.2 1.1 1.0 .6 .5 .9 1.7 2.7 2.5 1.7 7.4 4.4 4.5 5.6 2.6 3.4 1.2 -.1 .1 .0 .0 .0 1.3
.3 1.4 1.5 .9 1.0 .9 .6 .1 .9 .8 .5 3.3 1.7 -.4 -.3 .3 .7 .5 .4 2.0 -.1 1.5 3.1 1.3 2.6 .8 2.6 2.0 -.4 .0 .0 .0 .1
.8 1.0 1.2 .8 1.0 1.0 1.2 1.2 1.9 2.0 .7 1.7 1.7 1.2 .2 .3 -.1 .2 .8 .4 .3 1.7 3.0 2.1 1.9 2.0 1.9 .2 .7 .4 .0 .6 .4
1.4 2.0 2.2 1.6 2.1 1.3 1.5 1.8 2.1 2.4 2.8 2.7 2.0 2.1 .2 .5 -.1 -.2 .9 3.6 .2 .3 1.0 3.6 2.9 1.1 1.4 2.2 1.9 -.2 -1.1 -.2 -.4 -.1 1.4
1.5 1.9 1.8 2.3 2.8 2.1 1.2 1.8 1.3 1.9 2.4 2.3 1.6 1.4 .4 .4 .1 .3 .6 .3 .4 .1 .2 3.5 4.0 3.3 2.5 2.8 2.2 .1 .4 1.3
1.5 1.1 1.1 2.0 2.3 2.3 2.5 2.5 2.3 1.9 1.7 2.2 1.5 .6 .3 .4 .0 .2 .2 .1 1.4 .3 .2 2.3 4.1 4.9 2.6 1.9 .6 .1 .6 -.3 .2 .1 .4
.9 .5 1.6 2.3 1.8 1.0 1.9 1.5 3.2 3.4 1.6 2.0 1.1 .0 -.1 -.2 -.2 .1 -.2 .1 .1 .2 1.2 .9 .4 .2 .3 .0 .3 .0 .6
-1.2 -1.2 -2.1 -.8 -.6 -.5 -.7 -.6

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
MAY 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


3 3 3 3 4 5 4 3 5 4 5 3 3 2
4 4 4 4 3 3 5 5 5 4 4 5 5 3 3 3 3 3 8 8 5 5 4
4 4 4 4 4 4 5 5 4 4 4 3 4 3 3 3 3 3 6 6 4 4 4
3 4 3 4 4 5 7 7 6 5 3 5 4 3 3 4 5 11 12 10 9 8 12 4 3 3 3 3 3 3
4 4 4 5 5 6 5 5 6 5 4 4 3 3 4 6 7 8 15 11 9 8 10 6 8 7 3 2 2 2 3 3
3 4 4 4 4 4 4 4 4 5 6 5 4 3 3 3 3 5 6 7 5 6 7 6 5 4 7 6 3 2 3 3 3
3 3 3 3 3 3 4 4 5 6 6 5 4 4 3 3 3 4 4 5 5 8 8 8 7 6 6 6 3 3 3
4 4 4 4 4 4 4 4 5 6 8 6 5 4 3 3 3 3 5 9 3 4 7 7 6 7 6 7 9 4 5 4 3 3 4
4 3 4 5 5 5 4 4 5 4 5 5 4 4 3 4 3 3 4 6 3 5 5 7 7 7 5 6 5 3 2 4
4 4 4 4 5 5 5 4 5 4 4 4 5 3 3 3 4 4 3 3 4 5 3 7 8 8 6 5 4 3 3 4 3 3 4
5 5 5 5 4 5 5 4 7 6 5 5 5 4 3 4 3 4 3 3 3 4 3 5 5 4 3 4 4 3 7
5 5 5 4 4 4 4 4

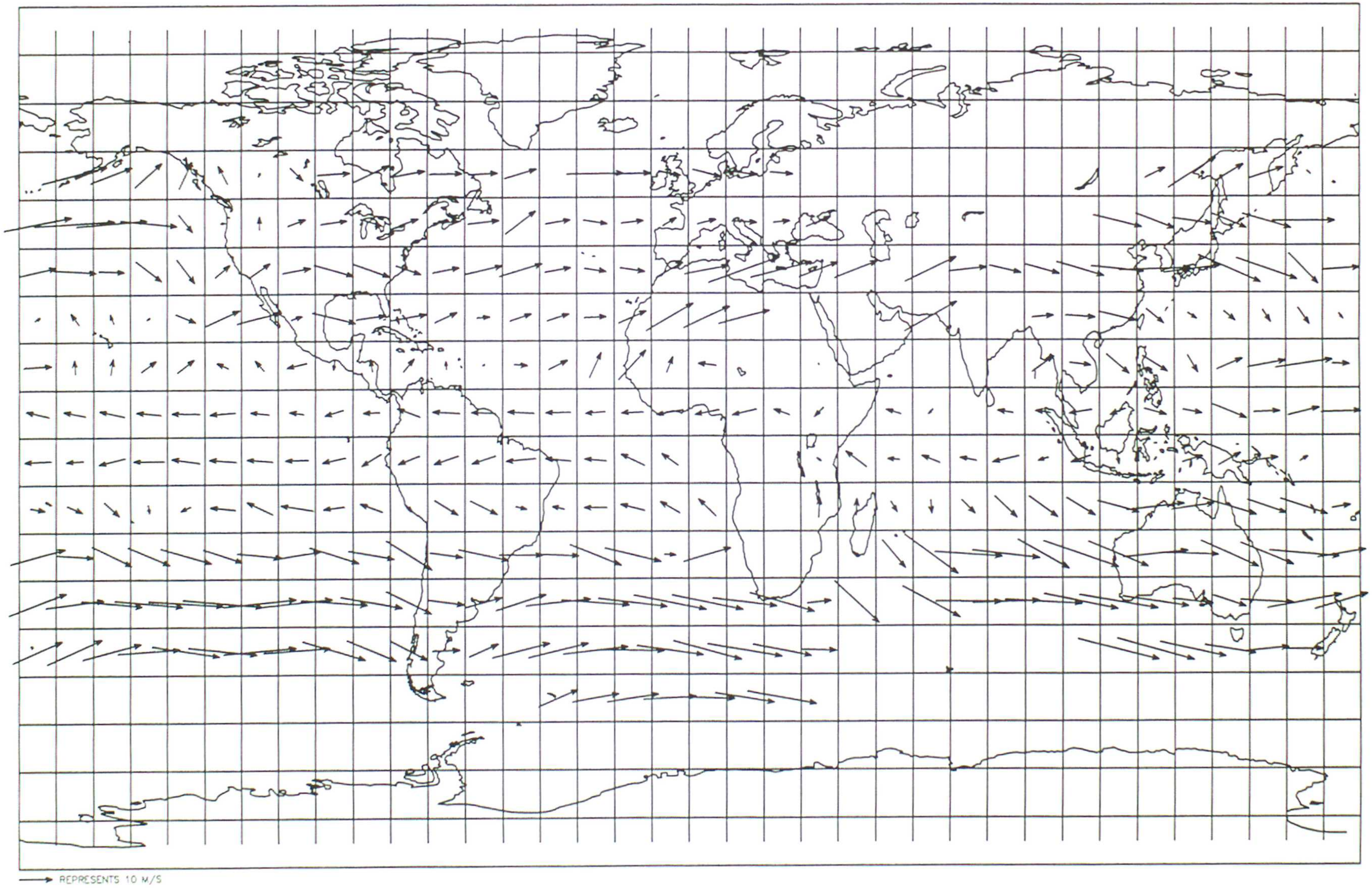
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
MAY 1998



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 14 | 17 | 17 | 18 | 11 | 9 | 14 | 31 | 35 | 26 | 21 | 5 | 0 | 2 | 2 | 2 | 3 | 4 | 3 | 1 | | | | | | | | | 1 | 1 | 1 | 0 | | |
| 9 | 22 | 24 | 26 | 39 | 44 | 48 | 42 | 43 | 60 | 56 | | 41 | 53 | 33 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 0 | | | | 0 | | 0 | 2 | 3 | 3 | 3 | 2 | 1 | 0 |
| 14 | 19 | 20 | 45 | 72 | 92 | 41 | 32 | 34 | 32 | 29 | 53 | 52 | 65 | 87 | 26 | 7 | 2 | 2 | 1 | 1 | | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 4 |
| 14 | 29 | 61 | 156 | 155 | 76 | 21 | 12 | 3 | 6 | 18 | 22 | 20 | 23 | 41 | 42 | 3 | 3 | 3 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 3 | 1 | 1 | 1 | 1 | 2 | 2 | 10 |
| 7 | 22 | 38 | 48 | 27 | 15 | 4 | 9 | 6 | 8 | 9 | 28 | 18 | 7 | 6 | 3 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 2 |
| 6 | 14 | 16 | 11 | 19 | 17 | 24 | 24 | 14 | 9 | 32 | 55 | 36 | 50 | 43 | 4 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 14 | 23 | 13 | 19 | 30 | 5 | 8 | 8 | 15 | 24 | 25 | 20 | 18 | 26 | 2 | 2 | 2 | 1 | 0 | 0 | 1 | 2 | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| 5 | 9 | 14 | 9 | 16 | 59 | 51 | 23 | 31 | 27 | 5 | 9 | 10 | 12 | 19 | 9 | 8 | 11 | 3 | 1 | 0 | 1 | 1 | 2 | 1 | 2 | 3 | 5 | 5 | 2 | 1 | 1 | | 1 | 0 | 2 |
| 23 | 21 | 14 | 14 | 12 | 37 | 48 | 19 | 22 | 14 | 8 | 6 | 10 | 19 | 18 | 15 | 2 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 23 |
| 51 | 52 | 55 | 63 | 60 | 31 | 53 | 33 | 30 | 36 | 34 | 24 | 24 | 33 | 24 | 9 | 4 | 5 | 5 | 1 | 1 | 1 | 1 | 0 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 12 |
| 12 | 20 | 27 | 29 | 21 | 14 | 38 | 48 | 34 | 24 | 22 | 24 | 21 | 28 | 24 | 8 | 8 | 8 | 6 | 3 | 3 | 1 | 0 | | | | | | 0 | 2 | 2 | 2 | 4 | 3 | 2 | 0 |
| | | | | | | | | | | | | | | 1 | 2 | 4 | 7 | 5 | 5 | 2 | 1 | | | | | | | | | | | | | | |

SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA
MAY 1998
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 16


REPRESENTS 10 M/S

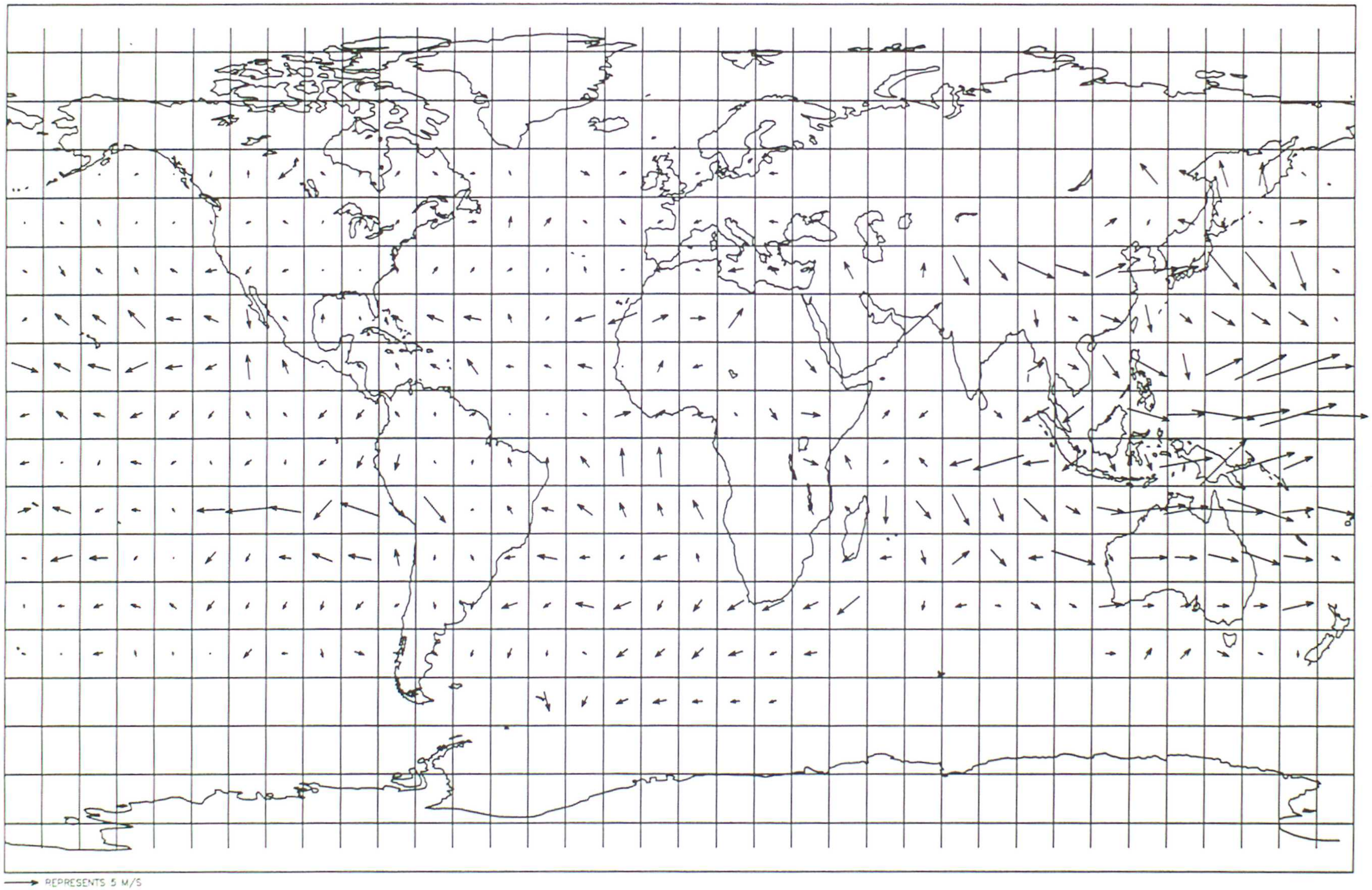
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

FIGURE 17

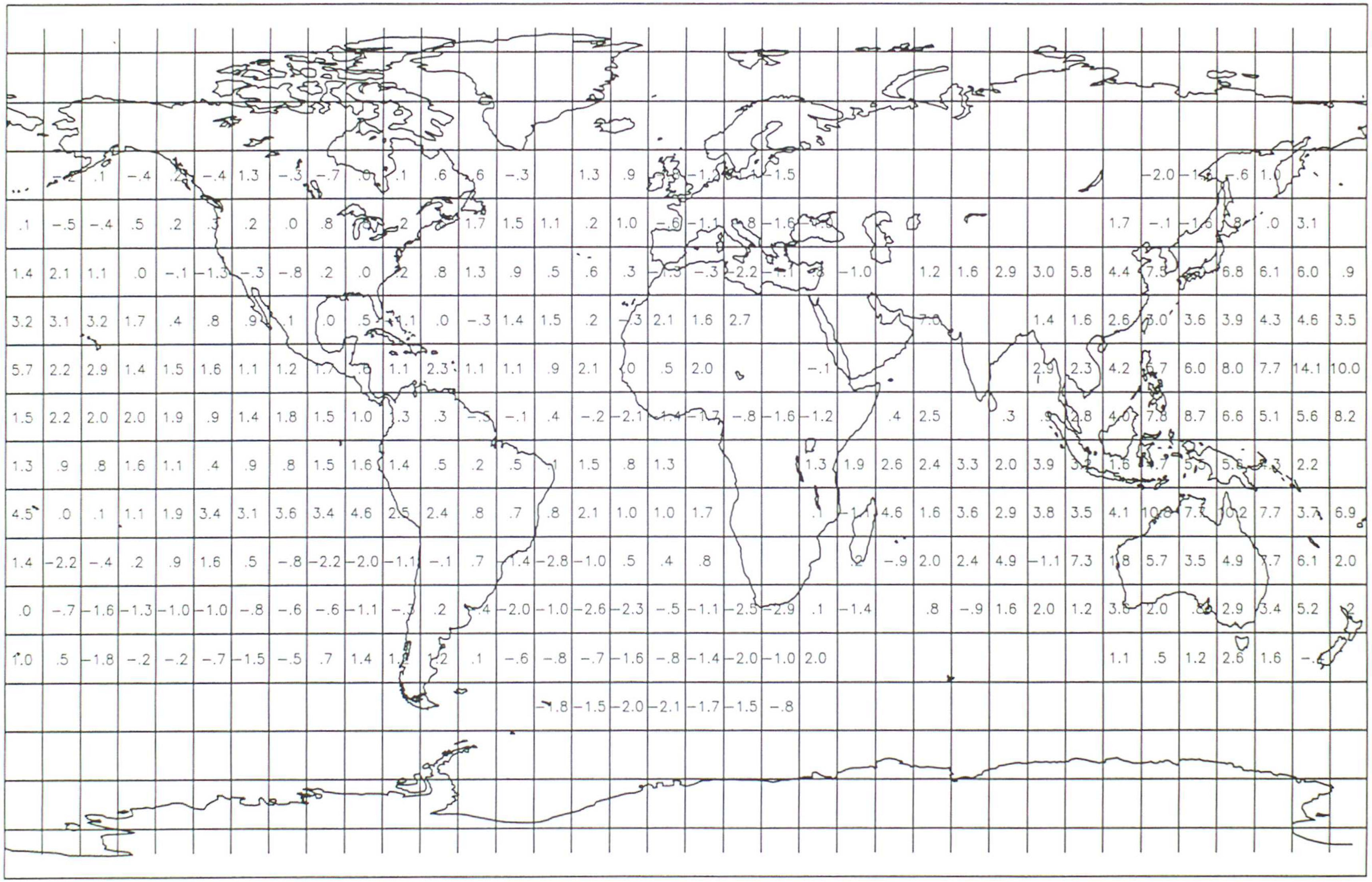
MAY 1998

ALL OBSERVATIONS

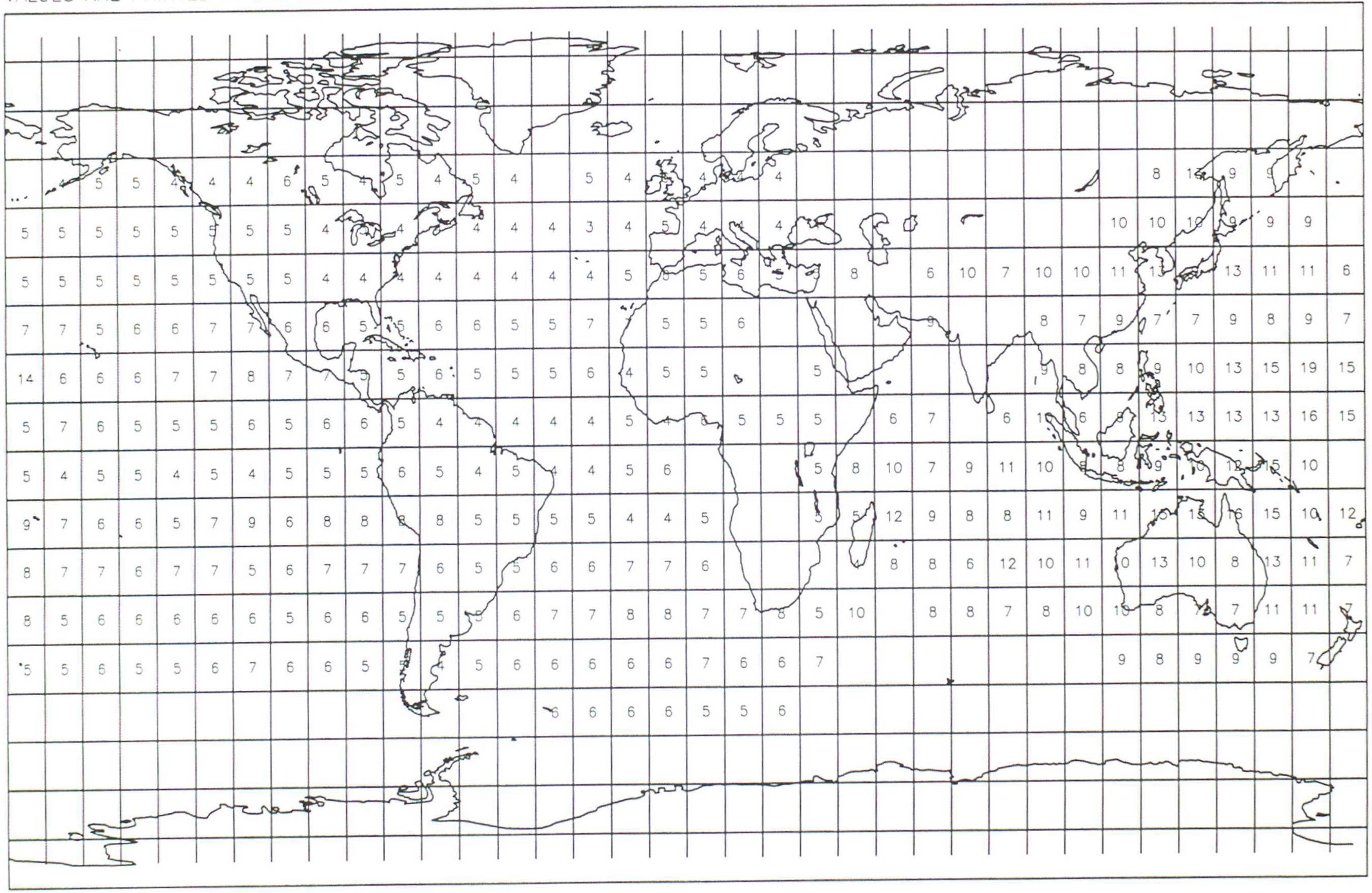
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


REPRESENTS 5 M/S

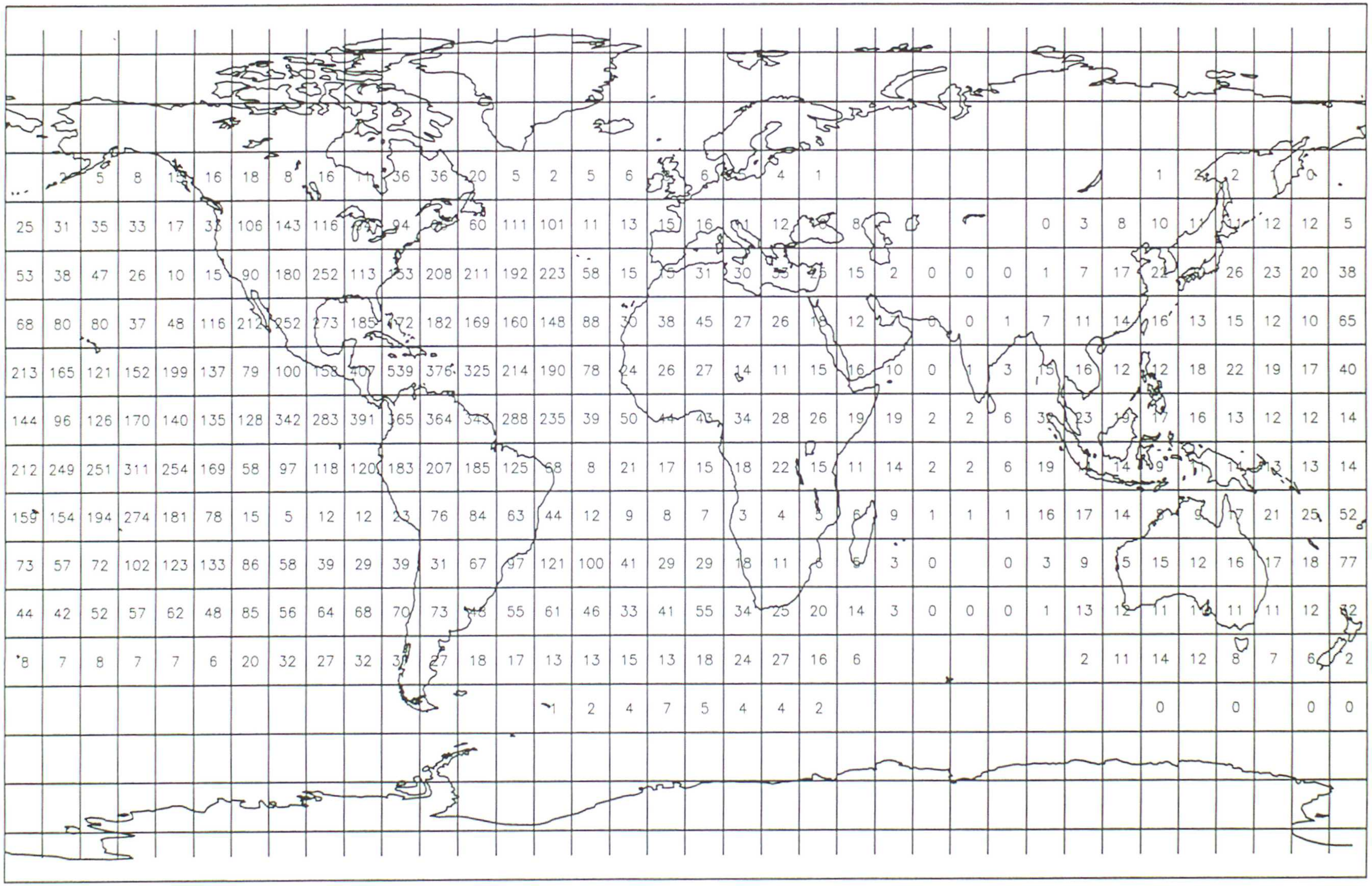
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
MAY 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


–.2 .1 –.4 .2 –.4 1.3 –.3 –.7 .0 .1 .6 .6 –.3 1.3 .9 –.8 –1.2 –1.1 –1.5 –2.0 –1.3 –.6 1.0
.1 –.5 –.4 .5 .2 .3 .2 .0 .8 .6 .2 1.7 1.5 1.1 .2 1.0 –.6 –1.1 –.8 –1.6 –1.0 1.7 –.1 –1.6 .8 .0 3.1
1.4 2.1 1.1 .0 –.1 –1.3 –.3 –.8 .2 .0 .2 .8 1.3 .9 .5 .6 .3 –1.3 –.3 –2.2 –1.1 .8 –1.0 1.2 1.6 2.9 3.0 5.8 4.4 7.5 6.8 6.1 6.0 .9
3.2 3.1 3.2 1.7 .4 .8 .9 .1 .0 .5 1.1 .0 –.3 1.4 1.5 .2 –.3 2.1 1.6 2.7 7.0 1.4 1.6 2.6 3.0 3.6 3.9 4.3 4.6 3.5
5.7 2.2 2.9 1.4 1.5 1.6 1.1 1.2 1.7 .6 1.1 2.3 1.1 1.1 .9 2.1 .0 .5 2.0 –.1 2.9 2.3 4.2 6.7 6.0 8.0 7.7 14.1 10.0
1.5 2.2 2.0 2.0 1.9 .9 1.4 1.8 1.5 1.0 .3 .3 –.5 –.1 .4 –.2 –2.1 –1.4 –1.7 –.8 –1.6 –1.2 .4 2.5 .3 .9 2.8 4.0 7.8 8.7 6.6 5.1 5.6 8.2
1.3 .9 .8 1.6 1.1 .4 .9 .8 1.5 1.6 1.4 .5 .2 .5 .1 1.5 .8 1.3 1.3 1.9 2.6 2.4 3.3 2.0 3.9 3.2 1.6 4.7 5.5 5.6 4.3 2.2
4.5 .0 .1 1.1 1.9 3.4 3.1 3.6 3.4 4.6 2.5 2.4 .8 .7 .8 2.1 1.0 1.0 1.7 .1 –1.1 4.6 1.6 3.6 2.9 3.8 3.5 4.1 10.8 7.7 10.2 7.7 3.7 6.9
1.4 –2.2 –.4 .2 .9 1.6 .5 –.8 –2.2 –2.0 –1.1 –.1 .7 –1.4 –2.8 –1.0 .5 .4 .8 .2 –.9 2.0 2.4 4.9 –1.1 7.3 1.8 5.7 3.5 4.9 7.7 6.1 2.0
.0 –.7 –1.6 –1.3 –1.0 –1.0 –.8 –.6 –.6 –1.1 –.3 .2 .4 –2.0 –1.0 –2.6 –2.3 –.5 –1.1 –2.5 –2.9 .1 –1.4 .8 –.9 1.6 2.0 1.2 3.6 2.0 .8 2.9 3.4 5.2 .2
1.0 .5 –1.8 –.2 –.2 –.7 –1.5 –.5 .7 1.4 1.2 1.2 .1 –.6 –.8 –.7 –1.6 –.8 –1.4 –2.0 –1.0 2.0 1.1 .5 1.2 2.6 1.6 –.4
–1.8 –1.5 –2.0 –2.1 –1.7 –1.5 –.8

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
MAY 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 5 5 4 4 4 6 5 4 5 4 5 4 5 4 5 4 4 4 8 13 9 9
5 5 5 5 5 5 5 5 4 5 4 4 4 4 4 3 4 5 4 4 4 4 10 10 10 9 9 9
5 5 5 5 5 5 5 5 4 4 4 4 4 4 4 4 5 6 5 6 5 5 8 6 10 7 10 10 11 13 13 11 11 6
7 7 5 6 6 7 7 6 6 5 5 6 6 5 5 7 7 5 5 6 9 8 7 9 7 7 9 8 9 7
14 6 6 6 7 7 8 7 7 5 5 6 5 5 5 6 4 5 5 5 9 8 8 9 10 13 15 19 15
5 7 6 5 5 5 6 5 6 6 5 4 4 4 4 4 5 4 6 5 5 5 6 7 6 10 6 8 13 13 13 13 16 15
5 4 5 5 4 5 4 5 5 5 6 5 4 5 4 4 5 6 5 8 10 7 9 11 10 8 8 9 10 12 15 10
9 7 6 6 5 7 9 6 8 8 8 8 5 5 5 5 4 4 5 5 5 12 9 8 8 11 9 11 15 15 16 15 10 12
8 7 7 6 7 7 5 6 7 7 7 6 5 5 6 6 7 7 6 4 8 8 6 12 10 11 10 13 10 8 13 11 7
8 5 6 6 6 6 6 5 6 6 5 5 5 6 7 7 8 8 7 7 8 5 10 8 8 7 8 10 10 8 7 7 11 11 7
5 5 6 5 5 6 7 6 6 5 5 4 5 6 6 6 6 6 7 6 6 7 9 8 9 9 9 7
6 6 6 6 5 5 6

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
MAY 1998



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 5 | 8 | 15 | 16 | 18 | 8 | 16 | 11 | 36 | 36 | 20 | 5 | 2 | 5 | 6 | [illegible] | 6 | 5 | 4 | 1 | | | | | | | | | 1 | 2 | 2 | 1 | 0 | |
| 25 | 31 | 35 | 33 | 17 | 33 | 106 | 143 | 116 | [illegible] | 94 | [illegible] | 60 | 111 | 101 | 11 | 13 | 15 | 16 | 11 | 12 | [illegible] | 8 | | | | | 0 | 3 | 8 | 10 | 11 | 11 | 12 | 12 | 5 |
| 53 | 38 | 47 | 26 | 10 | 15 | 90 | 180 | 252 | 113 | 153 | 208 | 211 | 192 | 223 | 58 | 15 | 15 | 31 | 30 | [illegible] | 25 | 15 | 2 | 0 | 0 | 0 | 1 | 7 | 17 | 22 | [illegible] | 26 | 23 | 20 | 38 |
| 68 | 80 | 80 | 37 | 48 | 116 | 212 | 252 | 273 | 185 | 172 | 182 | 169 | 160 | 148 | 88 | 30 | 38 | 45 | 27 | 26 | [illegible] | 12 | [illegible] | 0 | 0 | 1 | 7 | 11 | 14 | 16 | 13 | 15 | 12 | 10 | 65 |
| 213 | 165 | 121 | 152 | 199 | 137 | 79 | 100 | 158 | 407 | 539 | 376 | 325 | 214 | 190 | 78 | 24 | 26 | 27 | 14 | 11 | 15 | 16 | 10 | 0 | 1 | 3 | 15 | 16 | 12 | 12 | 18 | 22 | 19 | 17 | 40 |
| 144 | 96 | 126 | 170 | 140 | 135 | 128 | 342 | 283 | 391 | 365 | 364 | 343 | 288 | 235 | 39 | 50 | 44 | 43 | 34 | 28 | 26 | 19 | 19 | 2 | 2 | 6 | 39 | 23 | 19 | 17 | 16 | 13 | 12 | 12 | 14 |
| 212 | 249 | 251 | 311 | 254 | 169 | 58 | 97 | 118 | 120 | 183 | 207 | 185 | 125 | 68 | 8 | 21 | 17 | 15 | 18 | 22 | 15 | 11 | 14 | 2 | 2 | 6 | 19 | [illegible] | 14 | 9 | 11 | 14 | 13 | 13 | 14 |
| 159 | 154 | 194 | 274 | 181 | 78 | 15 | 5 | 12 | 12 | 23 | 76 | 84 | 63 | 44 | 12 | 9 | 8 | 7 | 3 | 4 | 5 | 6 | 9 | 1 | 1 | 1 | 16 | 17 | 14 | 8 | 9 | 17 | 21 | 25 | 52 |
| 73 | 57 | 72 | 102 | 123 | 133 | 86 | 58 | 39 | 29 | 39 | 31 | 67 | 97 | 121 | 100 | 41 | 29 | 29 | 18 | 11 | 6 | 5 | 3 | 0 | | 0 | 3 | 9 | 5 | 15 | 12 | 16 | 17 | 18 | 77 |
| 44 | 42 | 52 | 57 | 62 | 48 | 85 | 56 | 64 | 68 | 70 | 73 | 48 | 55 | 61 | 46 | 33 | 41 | 55 | 34 | 25 | 20 | 14 | 3 | 0 | 0 | 0 | 1 | 13 | 12 | 11 | [illegible] | 11 | 11 | 12 | 32 |
| 8 | 7 | 8 | 7 | 7 | 6 | 20 | 32 | 27 | 32 | [illegible] | 27 | 18 | 17 | 13 | 13 | 15 | 13 | 18 | 24 | 27 | 16 | 6 | | | | | | 2 | 11 | 14 | 12 | 8 | 7 | 6 | 2 |
| | | | | | | | | | | | | | | 1 | 2 | 4 | 7 | 5 | 4 | 4 | 2 | | | | | | | | | 0 | | 0 | | 0 | 0 |

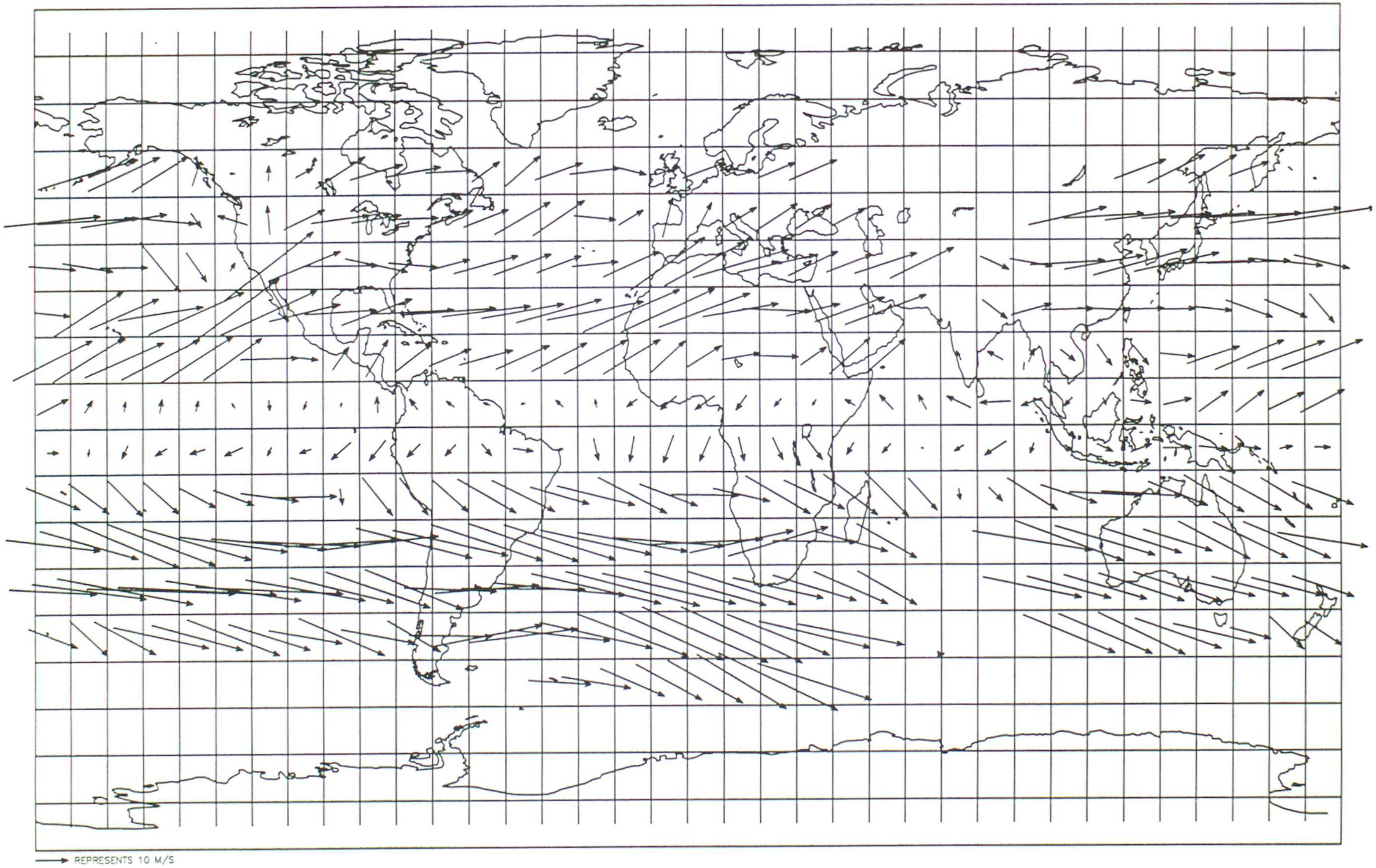
SATOB VECTOR MEAN WINDS BETWEEN 101–400 HPA

MAY 1998

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 21


REPRESENTS 10 M/S

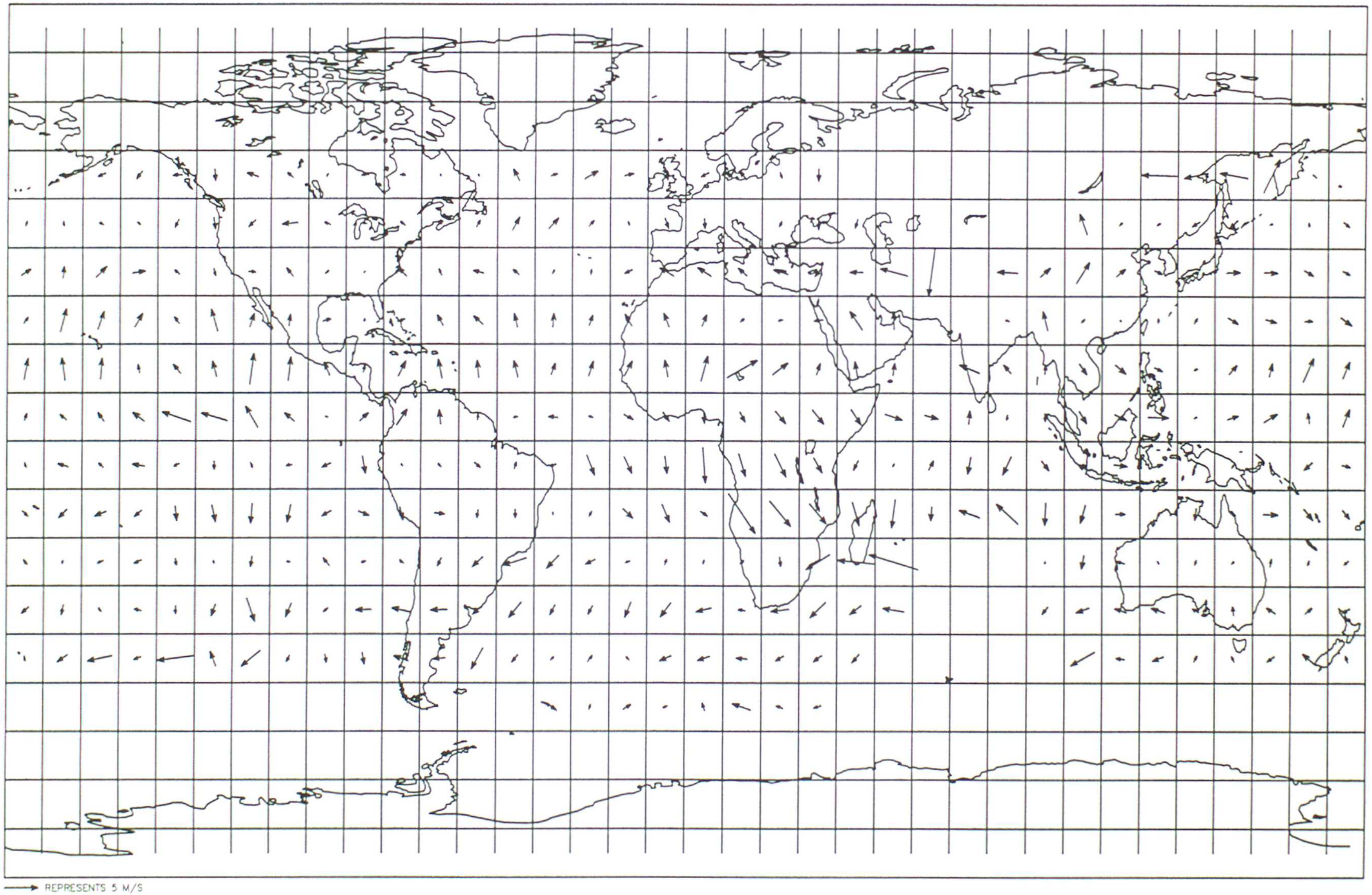
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA

FIGURE 22

MAY 1998

ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

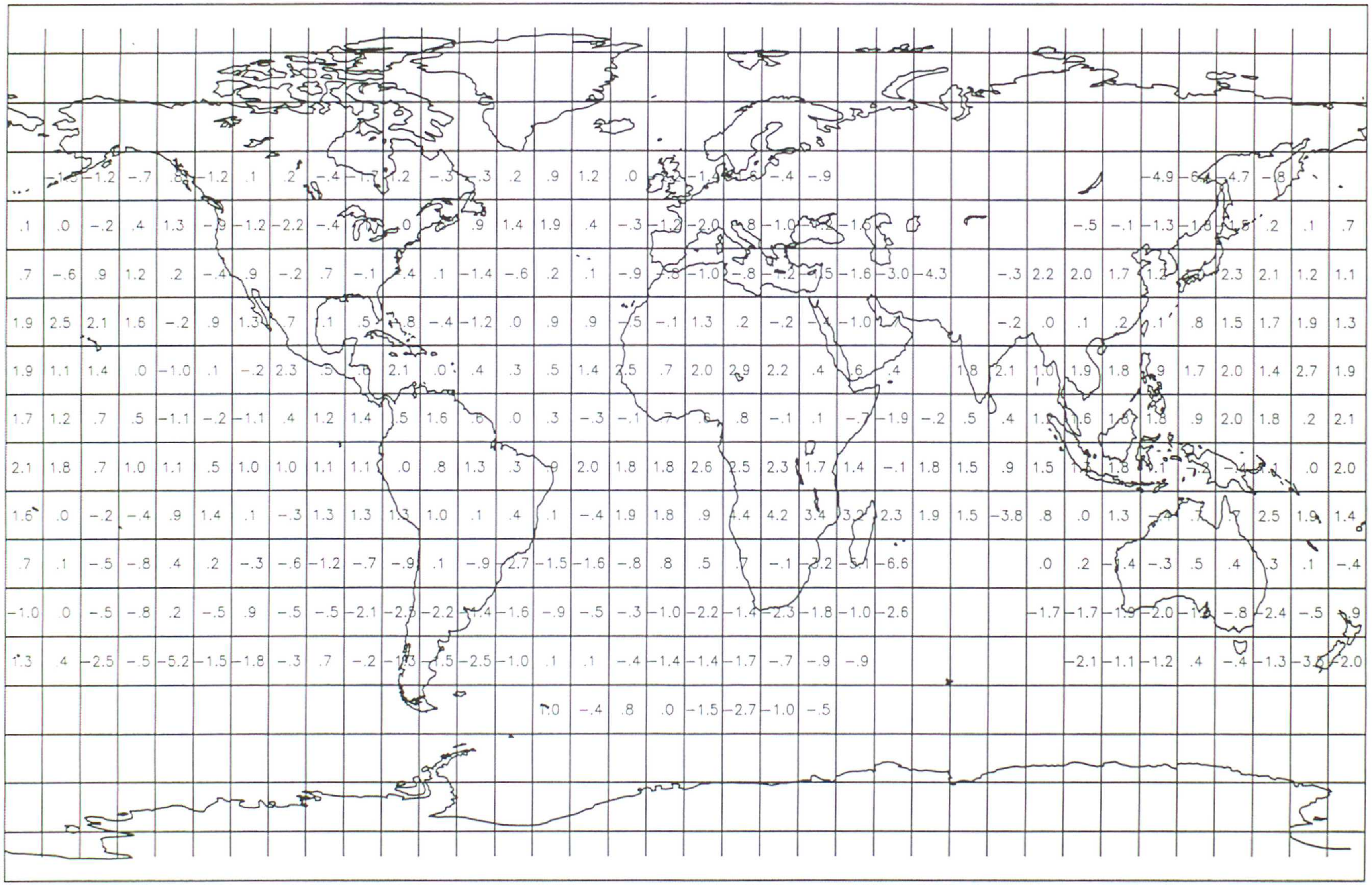

REPRESENTS 5 M/S

SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23

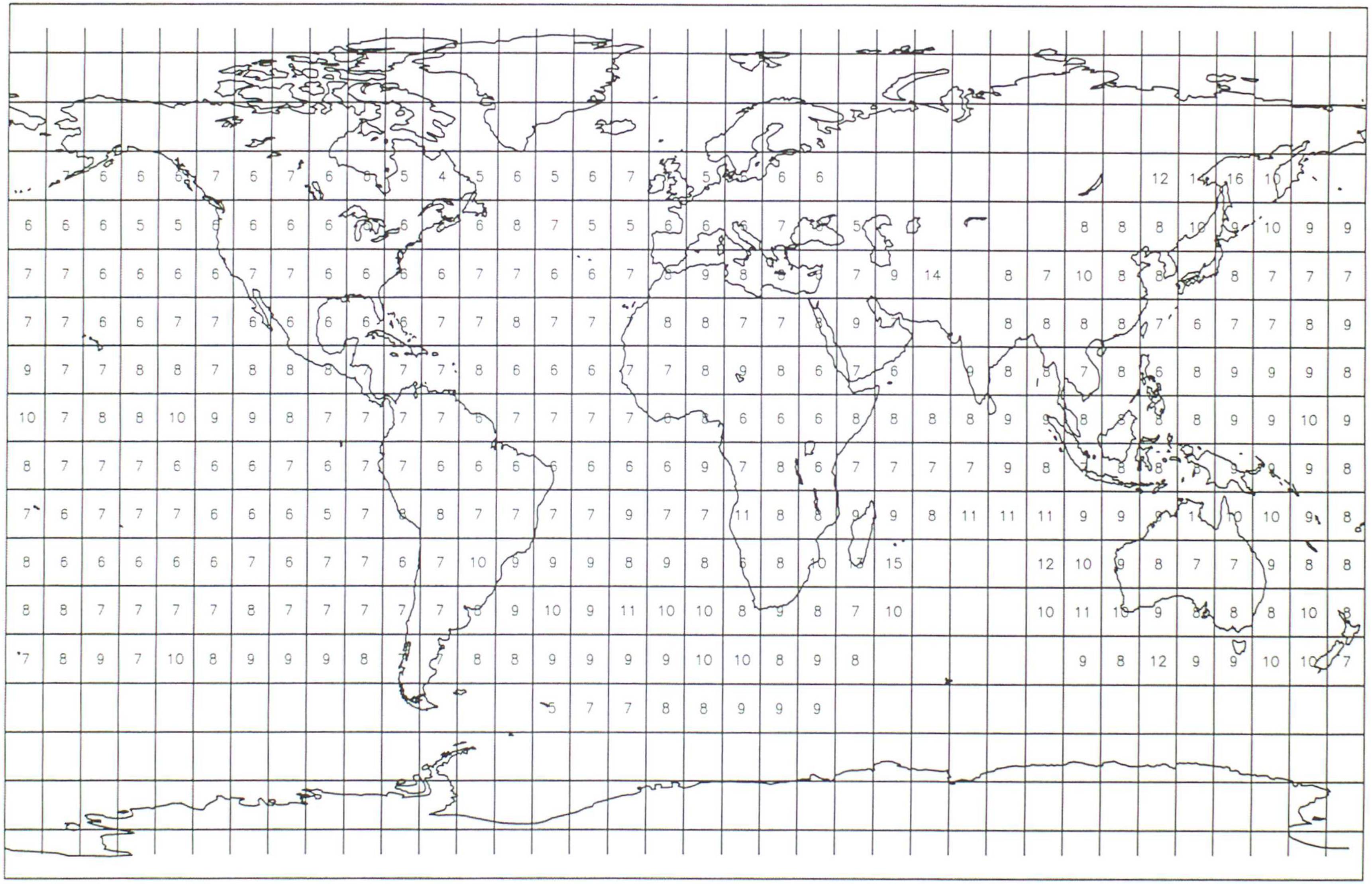
MAY 1998

USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-1.2 -.7 -1.2 .1 .2 -.4 -.3 .3 .2 .9 1.2 .0 -.4 -.9 -4.9 -4.7
.1 .0 -.2 .4 1.3 -1.2 -2.2 -.4 .0 .9 1.4 1.9 .4 -.3 -2.0 -1.0 -1.5 -.5 -.1 -1.3 .2 .1 .7
.7 -.6 .9 1.2 .2 -.4 .9 -.2 .7 -.1 .4 .1 -1.4 -.6 .2 .1 -.9 -1.0 -.8 -1.6 -3.0 -4.3 -.3 2.2 2.0 1.7 2.3 2.1 1.2 1.1
1.9 2.5 2.1 1.6 -.2 .9 1.3 .7 .1 .5 .8 -.4 -1.2 .0 .9 .9 -.1 1.3 .2 -.2 -1.0 -.2 .0 .1 .2 .1 .8 1.5 1.7 1.9 1.3
1.9 1.1 1.4 .0 -1.0 .1 -.2 2.3 2.1 .0 .4 .3 .5 1.4 .7 2.0 2.9 2.2 .4 .4 1.8 2.1 1.0 1.9 1.8 .9 1.7 2.0 1.4 2.7 1.9
1.7 1.2 .7 .5 -1.1 -.2 -1.1 .4 1.2 1.4 .5 1.6 .0 .3 -.3 .8 -.1 .1 -1.9 -.2 .5 .4 1.6 .9 2.0 1.8 .2 2.1
2.1 1.8 .7 1.0 1.1 .5 1.0 1.0 1.1 1.1 .0 .8 1.3 .3 2.0 1.8 1.8 2.6 2.5 2.3 1.7 1.4 -.1 1.8 1.5 .9 1.5 1.8 .0 2.0
1.6 .0 -.2 -.4 .9 1.4 .1 -.3 1.3 1.3 1.0 .1 .4 .1 -.4 1.9 1.8 .9 4.2 3.4 2.3 1.9 1.5 -3.8 .8 .0 1.3 2.5 1.9 1.4
.7 .1 -.5 -.8 .4 .2 -.3 -.6 -1.2 -.7 .1 -.9 2.7 -1.5 -1.6 -.8 .8 .5 .7 -.1 -6.6 .0 .2 -.3 .5 .4 .3 .1 -.4
-1.0 .0 -.5 -.8 .2 -.5 .9 -.5 -.5 -2.1 -2.2 -1.6 -.9 -.5 -.3 -1.0 -2.2 -1.4 -2.3 -1.8 -1.0 -2.6 -1.7 -1.7 -2.0 -.8 -2.4 -.5 .9
1.3 .4 -2.5 -.5 -5.2 -1.5 -1.8 -.3 .7 -.2 -1.5 -2.5 -1.0 .1 .1 -.4 -1.4 -1.4 -1.7 -.7 -.9 -.9 -2.1 -1.1 -1.2 .4 -.4 -1.3 -2.0
1.0 -.4 .8 .0 -1.5 -2.7 -1.0 -.5

SATOBS : RMS O–B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
MAY 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


7 6 6 6 7 6 7 6 6 5 4 5 6 5 6 7 5 5 6 6 12 14 16 10
6 6 6 5 5 6 6 6 6 6 6 6 8 7 5 5 6 6 6 7 8 5 8 8 8 10 9 10 9 9
7 7 6 6 6 6 7 7 6 6 6 6 7 7 6 6 7 8 9 8 6 6 7 9 14 8 7 10 8 8 8 7 7 7
7 7 6 6 7 7 6 6 6 6 6 7 7 8 7 7 7 8 8 7 7 8 9 8 8 8 8 7 6 7 7 8 9
9 7 7 8 8 7 8 8 8 7 7 7 8 6 6 6 7 7 8 9 8 6 7 6 9 8 8 7 8 6 8 9 9 9 8
10 7 8 8 10 9 9 8 7 7 7 7 6 7 7 7 7 8 8 6 6 6 8 8 8 8 9 9 8 8 8 8 9 9 10 9
8 7 7 7 6 6 6 7 6 7 7 6 6 6 6 6 6 6 9 7 8 6 7 7 7 7 9 8 7 8 8 9 9 9 9 8
7 6 7 7 7 6 6 6 5 7 8 8 7 7 7 7 9 7 7 11 8 8 9 9 8 11 11 11 9 9 9 11 10 10 9 8
8 6 6 6 6 6 7 6 7 7 6 7 10 9 9 9 8 9 8 6 8 10 13 15 12 10 9 8 7 7 9 8 8
8 8 7 7 7 7 8 7 7 7 7 7 8 9 10 9 11 10 10 8 9 8 7 10 10 11 10 9 8 8 8 10 8
7 8 9 7 10 8 9 9 9 8 7 7 8 8 9 9 9 9 10 10 8 9 8 9 8 12 9 9 10 10 7
5 7 7 8 8 9 9 9

# MONITORING OF SATELLITE TEMPERATURES

## MONITORING CENTRE: BRACKNELL

## MONTH: May, 1998

**Monitoring procedures**

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from NOAA-11, NOAA-14 500 km. |
| **Standard of comparison** | :Background field from Bracknell global model. |
| **Selection Criteria** | :All SATEM soundings where number of observations > 30. |
| **Data Extracted** | :Layer: 850 - 1000 hPa<br>100 - 300 hPa<br>30 - 50 hPa |
| | :Mean observation minus background temperature differences |

## NO DATA AVAILABLE

# TABLE 8

## MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
## DATA TYPE:- DRIFTER
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for drifting buoy.

**Area monitored** :10°N - 80°N, 85°W - 0°W

**Standard of comparison** :Background field from Bracknell global model.

**Position** :Average latitude and longitude for period.

**Observation times** :All hours combined.

**Elements monitored**
:Mean sea-level pressure (hPa)
:Wind speed (m $s^{-1}$)
:Wind direction (degrees)

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. A positive bias indicates the observation is veered to the background**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

**GROSS ERROR LIMITS**
:15 hPa (pressure)
:25 m $s^{-1}$ (Vector Wind)

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | LAT. | LONG. | HOUR | ELEM | LEVEL | NOBS | NGE | PGE | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | | | |
| 13502 | 15.8 | -36.8 | ALL | P | SUR | 221 | 0 | 0 | 0.8 | 0.5 | 1.0 |
| 13503 | 19.3 | -33.8 | ALL | P | SUR | 237 | 0 | 0 | 0.8 | -0.4 | 0.9 |
| 13903 | 23.1 | -47.3 | ALL | P | SUR | 147 | 0 | 0 | 1.0 | 1.3 | 1.6 |
| 13906 | 29.2 | -52.0 | ALL | P | SUR | 224 | 0 | 0 | 1.1 | 0.0 | 1.1 |
| 13912 | 18.0 | -66.4 | ALL | P | SUR | 82 | 0 | 0 | 1.1 | -0.6 | 1.3 |
| 13913 | 18.1 | -54.8 | ALL | P | SUR | 203 | 0 | 0 | 1.1 | 0.1 | 1.1 |
| 29805 | 39.2 | -61.9 | ALL | P | SUR | 11 | 0 | 0 | 1.0 | -0.2 | 1.1 |
| 339411 | 36.0 | -4.8 | ALL | P | SUR | 1 | 0 | 0 | 0.0 | -0.1 | 0.1 |
| 41501 | 19.7 | -44.0 | ALL | P | SUR | 47 | 0 | 0 | 2.6 | 2.6 | 3.7 |
| 41502 | 19.7 | -40.7 | ALL | P | SUR | 194 | 0 | 0 | 0.8 | 0.2 | 0.8 |
| 41503 | 15.4 | -49.6 | ALL | P | SUR | 62 | 0 | 0 | 0.9 | -0.3 | 0.9 |
| 41506 | 15.9 | -61.6 | ALL | P | SUR | 240 | 1 | 0 | 2.5 | 2.0 | 3.2 |
| 41520 | 16.1 | -41.7 | ALL | P | SUR | 207 | 0 | 0 | 0.9 | 0.7 | 1.1 |
| 41521 | 21.2 | -51.6 | ALL | P | SUR | 77 | 0 | 0 | 0.9 | 0.1 | 0.9 |
| 41524 | 17.9 | -62.9 | ALL | P | SUR | 275 | 0 | 0 | 1.0 | -5.7 | 5.7 |
| 41596 | 44.7 | -63.6 | ALL | P | SUR | 1 | 1 | 100 | 0.0 | 0.0 | 0.0 |
| 41597 | 34.3 | -27.3 | ALL | P | SUR | 666 | 0 | 0 | 0.7 | 0.3 | 0.8 |
| 41924 | 23.6 | -46.5 | ALL | P | SUR | 212 | 0 | 0 | 1.3 | -1.4 | 1.9 |
| 42534 | 40.1 | -48.6 | ALL | P | SUR | 1 | 0 | 0 | 0.0 | -2.3 | 2.3 |
| 44601 | 51.5 | -46.2 | ALL | P | SUR | 690 | 51 | 7 | 1.2 | 0.4 | 1.3 |
| 44602 | 52.3 | -39.3 | ALL | P | SUR | 605 | 27 | 4 | 1.0 | 0.1 | 1.0 |
| 44603 | 51.8 | -48.3 | ALL | P | SUR | 564 | 0 | 0 | 1.2 | 0.1 | 1.2 |
| 44604 | 42.7 | -48.1 | ALL | P | SUR | 443 | 0 | 0 | 0.9 | 0.3 | 1.0 |
| 44606 | 52.9 | -51.2 | ALL | P | SUR | 890 | 0 | 0 | 1.1 | 0.2 | 1.1 |
| 44609 | 58.7 | -20.6 | ALL | P | SUR | 1321 | 2 | 0 | 1.1 | 0.5 | 1.2 |
| 44613 | 39.2 | -40.1 | ALL | P | SUR | 687 | 3 | 0 | 0.9 | -0.2 | 0.9 |
| 44614 | 56.7 | -35.0 | ALL | P | SUR | 1415 | 9 | 1 | 1.2 | 0.2 | 1.2 |
| 44616 | 52.6 | -26.6 | ALL | P | SUR | 1222 | 1 | 0 | 1.1 | 0.2 | 1.1 |
| 44617 | 52.5 | -22.4 | ALL | P | SUR | 1175 | 5 | 0 | 1.2 | 0.3 | 1.2 |
| 44621 | 58.0 | -9.9 | ALL | P | SUR | 993 | 3 | 0 | 0.9 | -0.2 | 0.9 |
| 44624 | 60.4 | -6.3 | ALL | P | SUR | 48 | 0 | 0 | 1.0 | -0.3 | 1.1 |
| 44726 | 53.8 | -40.7 | ALL | P | SUR | 95 | 0 | 0 | 1.0 | -0.5 | 1.1 |
| 44727 | 59.7 | -20.3 | ALL | P | SUR | 2234 | 6 | 0 | 0.9 | 0.1 | 0.9 |
| 44742 | 43.0 | -44.4 | ALL | P | SUR | 770 | 1 | 0 | 1.0 | -0.1 | 1.0 |
| 44743 | 45.3 | -50.0 | ALL | P | SUR | 719 | 2 | 0 | 2.3 | 0.5 | 2.3 |
| 44761 | 56.7 | -39.3 | ALL | P | SUR | 184 | 0 | 0 | 1.6 | 0.4 | 1.6 |
| 44763 | 50.6 | -36.9 | ALL | P | SUR | 551 | 6 | 1 | 1.4 | 0.0 | 1.4 |
| 44765 | 57.6 | -47.3 | ALL | P | SUR | 859 | 5 | 1 | 1.5 | 0.1 | 1.6 |
| 44766 | 51.7 | -26.9 | ALL | P | SUR | 1115 | 4 | 0 | 1.0 | -0.1 | 1.0 |
| 44768 | 60.1 | -16.0 | ALL | P | SUR | 1581 | 2 | 0 | 0.8 | 0.3 | 0.8 |
| 44771 | 53.6 | -18.4 | ALL | P | SUR | 1199 | 4 | 0 | 0.9 | 0.2 | 0.9 |
| 44773 | 58.0 | -15.9 | ALL | P | SUR | 1524 | 4 | 0 | 0.9 | 0.1 | 0.9 |
| 44774 | 50.1 | -49.3 | ALL | P | SUR | 922 | 2 | 0 | 1.7 | -1.3 | 2.2 |
| 44775 | 62.2 | -27.9 | ALL | P | SUR | 1739 | 2 | 0 | 2.2 | -0.8 | 2.3 |
| 44776 | 47.9 | -46.4 | ALL | P | SUR | 74 | 0 | 0 | 1.2 | -0.2 | 1.2 |
| 44778 | 57.9 | -50.9 | ALL | P | SUR | 1416 | 7 | 0 | 1.2 | -0.3 | 1.2 |
| 44779 | 44.0 | -54.6 | ALL | P | SUR | 787 | 1 | 0 | 1.0 | -0.1 | 1.0 |
| 44780 | 58.2 | -20.4 | ALL | P | SUR | 1519 | 6 | 0 | 0.9 | 0.3 | 0.9 |
| 44901 | 54.6 | -46.6 | ALL | P | SUR | 147 | 0 | 0 | 1.2 | 0.6 | 1.4 |
| 44912 | 51.3 | -21.5 | ALL | P | SUR | 109 | 0 | 0 | 0.9 | 0.8 | 1.2 |
| 44925 | 57.4 | -53.5 | ALL | P | SUR | 182 | 0 | 0 | 1.5 | 0.7 | 1.6 |
| 47543 | 79.1 | -71.7 | ALL | P | SUR | 67 | 0 | 0 | 4.6 | -5.5 | 7.2 |
| 47550 | 76.5 | -74.6 | ALL | P | SUR | 397 | 0 | 0 | 5.7 | 1.2 | 5.9 |
| 48518 | 78.7 | -10.6 | ALL | P | SUR | 722 | 0 | 0 | 1.0 | -0.7 | 1.2 |
| 49805 | 24.2 | -67.0 | ALL | P | SUR | 8 | 0 | 0 | 1.8 | -0.3 | 1.8 |
| 51633 | 39.4 | -60.9 | ALL | P | SUR | 402 | 0 | 0 | 0.9 | -0.3 | 0.9 |
| 62501 | 45.6 | -11.6 | ALL | P | SUR | 201 | 0 | 0 | 1.0 | -0.3 | 1.0 |
| 62506 | 48.7 | -15.2 | ALL | P | SUR | 449 | 0 | 0 | 0.9 | 0.0 | 0.9 |
| 62551 | 46.2 | -14.2 | ALL | P | SUR | 609 | 0 | 0 | 0.9 | 0.4 | 0.9 |
| 62553 | 53.9 | -17.3 | ALL | P | SUR | 816 | 4 | 0 | 1.0 | 0.2 | 1.1 |

| IDENTIFIER | LAT. | LONG. | HOUR | ELEM | LEVEL | NOBS | NGE | PGE | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | | | |
| 62557 | 46.4 | -7.9 | ALL | P | SUR | 1138 | 3 | 0 | 1.1 | 0.3 | 1.1 |
| 62558 | 56.2 | -7.7 | ALL | P | SUR | 1414 | 2 | 0 | 0.9 | 0.3 | 1.0 |
| 62673 | 62.9 | -17.8 | ALL | P | SUR | 444 | 0 | 0 | 1.0 | -0.1 | 1.0 |
| 62674 | 61.2 | -20.1 | ALL | P | SUR | 455 | 0 | 0 | 1.0 | 0.0 | 1.0 |
| 62751 | 46.4 | -17.7 | ALL | P | SUR | 203 | 0 | 0 | 1.2 | 0.2 | 1.2 |
| 62755 | 42.5 | -10.6 | ALL | P | SUR | 64 | 0 | 0 | 1.3 | -0.4 | 1.3 |
| 62758 | 46.0 | -24.0 | ALL | P | SUR | 214 | 0 | 0 | 1.1 | 0.2 | 1.1 |
| 64528 | 60.2 | -22.5 | ALL | P | SUR | 1094 | 5 | 0 | 1.1 | -0.2 | 1.2 |
| 64529 | 62.2 | -28.5 | ALL | P | SUR | 1024 | 0 | 0 | 1.3 | -0.1 | 1.3 |
| 64530 | 62.1 | -56.0 | ALL | P | SUR | 1361 | 9 | 1 | 1.2 | 0.6 | 1.4 |
| 64552 | 62.3 | -39.7 | ALL | P | SUR | 1207 | 0 | 0 | 1.1 | 0.1 | 1.1 |
| 64561 | 51.7 | -14.9 | ALL | P | SUR | 1018 | 7 | 1 | 0.8 | 0.3 | 0.9 |
| 64563 | 59.8 | -32.9 | ALL | P | SUR | 2031 | 3 | 0 | 1.4 | -0.3 | 1.4 |
| 65562 | 60.9 | -17.4 | ALL | P | SUR | 2155 | 2 | 0 | 0.8 | -0.2 | 0.9 |
| 65571 | 62.3 | -33.9 | ALL | P | SUR | 1184 | 3 | 0 | 1.0 | 0.1 | 1.0 |
| 65591 | 63.6 | -29.1 | ALL | P | SUR | 1043 | 5 | 0 | 1.3 | 0.1 | 1.3 |
| 65592 | 63.0 | -25.3 | ALL | P | SUR | 1628 | 5 | 0 | 1.5 | -0.1 | 1.5 |
| 65594 | 65.0 | -31.6 | ALL | P | SUR | 2356 | 2 | 0 | 1.4 | 0.2 | 1.4 |
| 65597 | 56.5 | -20.4 | ALL | P | SUR | 1735 | 4 | 0 | 1.0 | -0.2 | 1.0 |
| 97805 | 38.1 | -38.7 | ALL | P | SUR | 1 | 0 | 0 | 0.0 | 0.2 | 0.2 |
| WIND SPEED | | | | | | | | | | | |
| 13502 | 15.8 | -36.8 | ALL | SPEED | SUR | 256 | 0 | 0 | 1.7 | 0.5 | 1.8 |
| 13503 | 19.3 | -33.8 | ALL | SPEED | SUR | 291 | 0 | 0 | 1.2 | -0.5 | 1.3 |
| 29805 | 39.2 | -61.9 | ALL | SPEED | SUR | 13 | 1 | 8 | 4.7 | 2.0 | 5.1 |
| 339411 | 36.0 | -4.8 | ALL | SPEED | SUR | 1 | 0 | 0 | 0.0 | 0.9 | 0.9 |
| 41501 | 19.7 | -44.0 | ALL | SPEED | SUR | 135 | 0 | 0 | 1.9 | 0.5 | 2.0 |
| 41502 | 19.7 | -40.7 | ALL | SPEED | SUR | 268 | 0 | 0 | 2.9 | -0.6 | 3.0 |
| 41503 | 15.4 | -49.6 | ALL | SPEED | SUR | 35 | 0 | 0 | 1.8 | 0.9 | 2.0 |
| 41506 | 15.9 | -61.6 | ALL | SPEED | SUR | 134 | 0 | 0 | 4.6 | -2.7 | 5.3 |
| 41520 | 16.1 | -41.7 | ALL | SPEED | SUR | 261 | 0 | 0 | 1.8 | 0.2 | 1.8 |
| 41521 | 21.2 | -51.6 | ALL | SPEED | SUR | 85 | 0 | 0 | 0.7 | 0.3 | 0.8 |
| 41523 | 15.7 | -58.2 | ALL | SPEED | SUR | 275 | 0 | 0 | 1.9 | -0.1 | 1.9 |
| 41524 | 17.9 | -62.9 | ALL | SPEED | SUR | 157 | 0 | 0 | 2.1 | -2.9 | 3.6 |
| 42534 | 40.1 | -48.6 | ALL | SPEED | SUR | 1 | 0 | 0 | 0.0 | -2.5 | 2.5 |
| 44601 | 51.5 | -46.2 | ALL | SPEED | SUR | 499 | 0 | 0 | 2.4 | 1.5 | 2.9 |
| 44602 | 52.3 | -39.3 | ALL | SPEED | SUR | 405 | 0 | 0 | 2.1 | -0.2 | 2.1 |
| 44609 | 58.7 | -20.6 | ALL | SPEED | SUR | 1436 | 0 | 0 | 3.7 | 0.6 | 3.7 |
| 44613 | 39.2 | -40.1 | ALL | SPEED | SUR | 2 | 0 | 0 | 6.2 | 33.0 | 33.6 |
| 44617 | 52.5 | -22.4 | ALL | SPEED | SUR | 1 | 0 | 0 | 0.0 | 42.3 | 42.3 |
| 44621 | 58.0 | -9.9 | ALL | SPEED | SUR | 607 | 1 | 0 | 2.1 | -0.7 | 2.2 |
| 44624 | 60.4 | -6.3 | ALL | SPEED | SUR | 37 | 2 | 5 | 5.5 | -4.4 | 7.0 |
| 44773 | 58.0 | -15.9 | ALL | SPEED | SUR | 1970 | 3 | 0 | 2.0 | -2.2 | 3.0 |
| 49805 | 24.2 | -67.0 | ALL | SPEED | SUR | 13 | 1 | 8 | 3.4 | 2.9 | 4.5 |
| 62551 | 46.2 | -14.2 | ALL | SPEED | SUR | 476 | 0 | 0 | 1.4 | 0.5 | 1.5 |
| 62553 | 53.9 | -17.3 | ALL | SPEED | SUR | 1272 | 0 | 0 | 1.3 | -0.6 | 1.4 |
| 62567 | 43.7 | -11.3 | ALL | SPEED | SUR | 768 | 0 | 0 | 1.4 | 0.3 | 1.5 |
| 62673 | 62.9 | -17.8 | ALL | SPEED | SUR | 403 | 0 | 0 | 2.5 | 0.5 | 2.6 |
| 62674 | 61.2 | -20.1 | ALL | SPEED | SUR | 642 | 0 | 0 | 2.4 | -1.2 | 2.7 |
| 62751 | 46.4 | -17.7 | ALL | SPEED | SUR | 849 | 0 | 0 | 1.3 | 0.1 | 1.3 |
| 62753 | 43.0 | -18.1 | ALL | SPEED | SUR | 832 | 0 | 0 | 1.4 | 0.6 | 1.5 |
| 62754 | 49.3 | -14.6 | ALL | SPEED | SUR | 741 | 0 | 0 | 1.4 | 0.3 | 1.5 |
| 62755 | 42.5 | -10.6 | ALL | SPEED | SUR | 253 | 0 | 0 | 1.3 | 0.6 | 1.4 |
| 62756 | 44.2 | -3.3 | ALL | SPEED | SUR | 422 | 0 | 0 | 0.7 | 1.1 | 1.3 |
| 62758 | 46.0 | -24.0 | ALL | SPEED | SUR | 933 | 0 | 0 | 1.9 | 0.1 | 1.9 |
| 62759 | 41.3 | -14.3 | ALL | SPEED | SUR | 768 | 0 | 0 | 1.7 | 0.7 | 1.8 |
| 62760 | 48.4 | -12.9 | ALL | SPEED | SUR | 762 | 0 | 0 | 1.2 | 0.2 | 1.2 |
| 62953 | 53.0 | -16.3 | ALL | SPEED | SUR | 2 | 0 | 0 | 0.0 | 0.2 | 0.2 |
| 64563 | 59.8 | -32.9 | ALL | SPEED | SUR | 2 | 0 | 0 | 22.1 | 23.4 | 32.2 |
| 65591 | 63.6 | -29.1 | ALL | SPEED | SUR | 1 | 0 | 0 | 0.0 | 36.5 | 36.5 |
| 97805 | 38.1 | -38.7 | ALL | SPEED | SUR | 2 | 0 | 0 | 0.0 | 3.3 | 3.3 |

| IDENTIFIER | LAT. | LONG. | HOUR | ELEM | LEVEL | NOBS | NGE | PGE | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WIND DIRECTION | | | | | | | | | | | |
| 13502 | 15.8 | -36.8 | ALL | DIRN. | SUR | 184 | 0 | 0 | 25.6 | 30.6 | 39.9 |
| 13503 | 19.3 | -33.8 | ALL | DIRN. | SUR | 171 | 0 | 0 | 21.7 | 11.1 | 24.3 |
| 29805 | 39.2 | -61.9 | ALL | DIRN. | SUR | 9 | 1 | 11 | 19.5 | -9.1 | 21.5 |
| 339411 | 36.0 | -4.8 | ALL | DIRN. | SUR | 1 | 0 | 0 | 0.0 | 21.2 | 21.2 |
| 41501 | 19.7 | -44.0 | ALL | DIRN. | SUR | 65 | 0 | 0 | 42.4 | 39.8 | 58.2 |
| 41502 | 19.7 | -40.7 | ALL | DIRN. | SUR | 100 | 0 | 0 | 19.6 | 5.6 | 20.3 |
| 41503 | 15.4 | -49.6 | ALL | DIRN. | SUR | 52 | 0 | 0 | 12.6 | 17.8 | 21.8 |
| 41506 | 15.9 | -61.6 | ALL | DIRN. | SUR | 8 | 0 | 0 | 50.2 | -15.9 | 52.7 |
| 41520 | 16.1 | -41.7 | ALL | DIRN. | SUR | 144 | 0 | 0 | 21.9 | 30.4 | 37.5 |
| 41521 | 21.2 | -51.6 | ALL | DIRN. | SUR | 69 | 0 | 0 | 13.2 | 14.3 | 19.5 |
| 41523 | 15.7 | -58.2 | ALL | DIRN. | SUR | 151 | 0 | 0 | 18.3 | 0.3 | 18.3 |
| 44601 | 51.5 | -46.2 | ALL | DIRN. | SUR | 291 | 0 | 0 | 28.4 | 0.7 | 28.4 |
| 44602 | 52.3 | -39.3 | ALL | DIRN. | SUR | 274 | 0 | 0 | 26.7 | 0.9 | 26.7 |
| 44609 | 58.7 | -20.6 | ALL | DIRN. | SUR | 656 | 0 | 0 | 20.3 | 1.6 | 20.4 |
| 44621 | 58.0 | -9.9 | ALL | DIRN. | SUR | 792 | 1 | 0 | 23.1 | -14.8 | 27.5 |
| 44624 | 60.4 | -6.3 | ALL | DIRN. | SUR | 8 | 2 | 25 | 4.8 | 0.2 | 4.8 |
| 44773 | 58.0 | -15.9 | ALL | DIRN. | SUR | 918 | 3 | 0 | 19.0 | -8.0 | 20.6 |
| 49805 | 24.2 | -67.0 | ALL | DIRN. | SUR | 3 | 1 | 33 | 17.1 | -14.8 | 22.7 |
| 62551 | 46.2 | -14.2 | ALL | DIRN. | SUR | 251 | 0 | 0 | 25.7 | -12.8 | 28.7 |
| 62553 | 53.9 | -17.3 | ALL | DIRN. | SUR | 332 | 0 | 0 | 13.0 | -2.4 | 13.2 |
| 62567 | 43.7 | -11.3 | ALL | DIRN. | SUR | 370 | 0 | 0 | 11.9 | 3.0 | 12.3 |
| 62673 | 62.9 | -17.8 | ALL | DIRN. | SUR | 188 | 0 | 0 | 20.2 | 6.5 | 21.2 |
| 62674 | 61.2 | -20.1 | ALL | DIRN. | SUR | 259 | 0 | 0 | 16.5 | -7.5 | 18.1 |
| 62751 | 46.4 | -17.7 | ALL | DIRN. | SUR | 335 | 0 | 0 | 19.8 | 1.7 | 19.9 |
| 62753 | 43.0 | -18.1 | ALL | DIRN. | SUR | 345 | 0 | 0 | 14.3 | 8.1 | 16.4 |
| 62754 | 49.3 | -14.6 | ALL | DIRN. | SUR | 312 | 0 | 0 | 12.7 | 6.1 | 14.1 |
| 62755 | 42.5 | -10.6 | ALL | DIRN. | SUR | 104 | 0 | 0 | 14.5 | 8.4 | 16.7 |
| 62756 | 44.2 | -3.3 | ALL | DIRN. | SUR | 37 | 0 | 0 | 20.2 | -32.0 | 37.9 |
| 62758 | 46.0 | -24.0 | ALL | DIRN. | SUR | 274 | 0 | 0 | 14.4 | -5.5 | 15.4 |
| 62759 | 41.3 | -14.3 | ALL | DIRN. | SUR | 355 | 0 | 0 | 52.8 | -2.3 | 52.8 |
| 62760 | 48.4 | -12.9 | ALL | DIRN. | SUR | 386 | 0 | 0 | 13.6 | 7.0 | 15.3 |

## TABLE 9

# MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures:**

**Period** :One calendar month.

**Data monitored** :Statistics for each airline carrier.

**Area monitored** :40°N - 70°N, 60°W - 0°W.

**Standard of comparison** :Background field from Bracknell global model.

**Observation times** :All hours combined.

**Level(s) monitored** :300.0 - 150.0 hPa

**Elements monitored** :TEMP in °C ; WIND in m s$^{-1}$

**Parameters monitored** :N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

**GROSS ERROR LIMITS** :10.0 °C ; 60 m s$^{-1}$ Vector Wind

**SELECTION CRITERIA** :N REP $\geq$ 20

**NB:** US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

|  |  | TEMPERATURE |  |  |  |  |  | WIND |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAL | 3711 | 1 | 27 | 1.9 | -0.1 | 2776 | 0 | 14 | 0 | 6.9 | 0.9 |
| ACA | 1297 | 0 | 11 | 2.0 | -0.2 | 1201 | 0 | 5 | 0 | 6.1 | 0.6 |
| AEA | 193 | 1 | 26 | 2.7 | 0.8 | 170 | 0 | 21 | 2 | 8.6 | 0.7 |
| AEL | 441 | 0 | 15 | 1.6 | -0.4 | 446 | 0 | 16 | 0 | 8.1 | 0.9 |
| AEY | 26 | 0 | 4 | 1.2 | 0.1 | 26 | 0 | 0 | 0 | 7.3 | 2.3 |
| AFL | 313 | 1 | 14 | 1.7 | 0.2 | 277 | 1 | 8 | 0 | 8.1 | 0.8 |
| AFR | 1177 | 1 | 14 | 1.6 | 0.0 | 1196 | 0 | 13 | 0 | 7.5 | 1.2 |
| AIH | 161 | 1 | 12 | 1.7 | 0.1 | 154 | 0 | 9 | 1 | 8.5 | 1.3 |
| AJM | 64 | 0 | 5 | 1.5 | -0.9 | 63 | 0 | 6 | 0 | 9.1 | 0.9 |
| AMX | 206 | 1 | 7 | 1.7 | 0.0 | 204 | 0 | 4 | 0 | 6.6 | 0.8 |
| ANZ | 210 | 0 | 3 | 1.8 | -0.9 | 208 | 0 | 5 | 0 | 8.5 | 0.3 |
| AOM | 252 | 0 | 5 | 1.4 | 0.7 | 260 | 1 | 7 | 0 | 7.6 | 0.9 |
| AUA | 29 | 3 | 31 | 3.1 | -1.5 | 21 | 0 | 10 | 0 | 8.9 | 1.9 |
| AVA | 148 | 0 | 6 | 2.0 | -0.1 | 151 | 0 | 5 | 0 | 7.3 | 0.5 |
| AZA | 257 | 4 | 26 | 2.2 | -0.1 | 218 | 0 | 14 | 0 | 7.7 | 0.8 |
| BAL | 565 | 0 | 22 | 1.4 | -0.4 | 575 | 0 | 23 | 1 | 7.2 | 1.2 |
| BAW | 1553 | 1 | 23 | 2.1 | -0.2 | 1363 | 0 | 18 | 0 | 7.3 | 0.9 |
| BBB | 33 | 0 | 24 | 1.6 | -0.8 | 27 | 0 | 7 | 0 | 5.6 | 0.6 |
| BWA | 101 | 1 | 8 | 1.5 | 0.2 | 93 | 0 | 5 | 0 | 6.0 | 1.5 |
| CDN | 386 | 0 | 6 | 1.7 | 0.6 | 364 | 0 | 5 | 0 | 8.0 | 1.2 |
| CFC | 27 | 0 | 22 | 2.7 | 1.1 | 26 | 0 | 27 | 0 | 12.2 | 5.8 |
| CFG | 628 | 0 | 7 | 2.0 | -1.2 | 614 | 0 | 5 | 0 | 7.8 | 1.0 |
| CKT | 107 | 0 | 15 | 1.4 | 0.5 | 96 | 0 | 10 | 0 | 8.1 | -0.5 |
| CLX | 326 | 1 | 11 | 1.9 | -0.6 | 306 | 0 | 6 | 0 | 6.5 | 0.6 |
| CMM | 289 | 0 | 9 | 1.6 | 0.0 | 264 | 0 | 5 | 0 | 6.0 | 1.0 |
| COA | 1135 | 0 | 22 | 1.6 | 0.2 | 868 | 0 | 16 | 0 | 12.0 | 3.1 |
| CRL | 203 | 1 | 2 | 1.6 | 0.8 | 202 | 0 | 3 | 0 | 7.4 | 0.9 |
| CSA | 26 | 4 | 23 | 1.4 | -0.8 | 21 | 0 | 14 | 0 | 5.0 | 1.5 |
| CTB | 209 | 1 | 3 | 1.8 | -0.4 | 206 | 0 | 2 | 0 | 6.2 | 1.1 |
| CTM | 20 | 0 | 15 | 2.6 | -2.0 | 20 | 0 | 10 | 0 | 6.4 | 0.8 |
| CUB | 326 | 1 | 8 | 1.9 | 0.7 | 323 | 0 | 100 | 0 | 9.0 | 1.2 |
| DAL | 3310 | 1 | 29 | 1.9 | -0.6 | 2436 | 0 | 18 | 0 | 7.3 | 0.8 |
| DBY | 211 | 0 | 5 | 1.7 | -1.1 | 217 | 0 | 7 | 0 | 8.6 | 1.3 |
| DHL | 201 | 6 | 44 | 4.4 | -2.5 | 159 | 0 | 18 | 0 | 9.4 | 1.1 |
| DLH | 2645 | 1 | 17 | 1.8 | -0.1 | 2302 | 0 | 11 | 0 | 6.7 | 0.7 |
| EIA | 48 | 0 | 13 | 1.5 | 0.3 | 45 | 0 | 22 | 0 | 15.5 | 4.2 |
| EIN | 28 | 0 | 0 | 1.7 | -0.3 | 29 | 0 | 0 | 0 | 5.3 | 1.5 |
| ELY | 110 | 0 | 7 | 1.3 | -0.2 | 110 | 0 | 7 | 0 | 7.7 | 1.6 |
| EWW | 99 | 7 | 16 | 2.0 | 1.0 | 93 | 0 | 46 | 0 | 12.0 | 3.3 |
| FDX | 197 | 2 | 25 | 1.5 | 0.3 | 149 | 0 | 11 | 0 | 6.0 | 0.9 |
| FIN | 376 | 1 | 22 | 1.9 | 0.4 | 303 | 0 | 13 | 0 | 7.0 | 0.7 |
| GAF | 182 | 1 | 31 | 2.9 | 0.5 | 133 | 0 | 19 | 0 | 8.1 | 0.6 |
| HLF | 52 | 0 | 25 | 2.5 | -1.1 | 44 | 0 | 14 | 0 | 6.4 | 1.4 |
| IBE | 1127 | 2 | 27 | 2.0 | 0.6 | 1009 | 0 | 21 | 0 | 8.2 | 1.3 |
| ICE | 964 | 0 | 26 | 1.9 | 0.1 | 732 | 0 | 16 | 0 | 6.6 | 0.6 |
| JKK | 165 | 2 | 34 | 2.0 | -0.3 | 124 | 0 | 23 | 0 | 8.1 | 0.3 |
| KLM | 2616 | 0 | 24 | 1.7 | -0.2 | 2466 | 0 | 22 | 0 | 7.3 | 0.9 |
| LDA | 166 | 1 | 27 | 1.5 | -1.0 | 156 | 0 | 23 | 0 | 7.6 | 0.7 |
| LDI | 266 | 0 | 29 | 1.7 | -0.9 | 236 | 0 | 24 | 0 | 6.6 | 0.4 |
| LEI | 130 | 0 | 20 | 1.6 | 0.2 | 108 | 0 | 12 | 0 | 6.6 | 0.5 |
| LIB | 139 | 1 | 4 | 1.5 | 0.7 | 146 | 0 | 5 | 0 | 8.3 | 1.1 |
| LOT | 276 | 0 | 18 | 2.2 | -0.9 | 231 | 0 | 9 | 0 | 7.4 | 0.2 |
| LTU | 703 | 1 | 23 | 1.6 | -0.3 | 604 | 0 | 15 | 0 | 7.5 | 1.1 |
| LXR | 28 | 0 | 43 | 2.6 | 0.2 | 27 | 4 | 41 | 0 | 11.6 | 1.1 |
| MAS | 102 | 1 | 15 | 2.0 | 0.4 | 92 | 0 | 10 | 0 | 7.2 | 1.8 |
| MON | 92 | 3 | 17 | 1.8 | 0.6 | 74 | 0 | 7 | 0 | 8.3 | 1.3 |
| MPD | 44 | 2 | 7 | 2.1 | 1.7 | 44 | 0 | 5 | 0 | 8.0 | 0.0 |
| MPH | 629 | 0 | 8 | 1.7 | -0.7 | 608 | 0 | 6 | 0 | 7.8 | 0.5 |
| NWA | 3312 | 0 | 13 | 1.9 | 0.7 | 2970 | 0 | 7 | 0 | 7.5 | 0.5 |

|  |  | TEMPERATURE |  |  |  | WIND |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| OAL | 32 | 0 | 22 | 3.5 | 2.0 | 21 | 0 | 10 | 0 | 12.3 | 1.7 |
| PAC | 101 | 0 | 30 | 1.7 | 0.4 | 76 | 0 | 18 | 0 | 6.1 | 1.3 |
| RAM | 43 | 0 | 0 | 1.8 | 0.1 | 42 | 0 | 31 | 0 | 6.4 | 1.0 |
| RCH | 226 | 4 | 23 | 2.4 | 0.4 | 196 | 0 | 18 | 1 | 11.1 | 1.8 |
| RJA | 42 | 0 | 29 | 1.6 | 0.7 | 30 | 0 | 23 | 0 | 10.7 | 0.4 |
| ROY | 230 | 1 | 17 | 1.4 | -0.5 | 204 | 0 | 10 | 0 | 8.1 | 0.9 |
| RRR | 98 | 3 | 21 | 1.7 | -0.2 | 92 | 0 | 16 | 0 | 7.9 | 1.9 |
| SAB | 111 | 2 | 19 | 1.8 | 0.1 | 86 | 0 | 12 | 0 | 5.9 | 1.3 |
| SAS | 967 | 0 | 1 | 1.7 | -0.1 | 965 | 0 | 1 | 0 | 7.2 | 0.3 |
| SIA | 117 | 0 | 5 | 1.6 | -1.2 | 125 | 1 | 10 | 0 | 9.2 | 1.3 |
| SLR | 82 | 0 | 18 | 1.4 | -0.5 | 86 | 0 | 23 | 0 | 11.3 | 1.1 |
| SVA | 68 | 0 | 9 | 1.9 | 0.1 | 72 | 0 | 74 | 0 | 6.8 | 0.9 |
| SWR | 265 | 1 | 21 | 1.4 | 0.0 | 222 | 0 | 11 | 0 | 6.7 | 1.7 |
| TAP | 323 | 0 | 4 | 1.5 | -0.7 | 319 | 0 | 6 | 0 | 9.1 | 1.9 |
| TOW | 62 | 0 | 21 | 2.0 | 0.3 | 51 | 0 | 20 | 0 | 9.4 | 1.0 |
| TSC | 155 | 2 | 34 | 2.0 | 0.2 | 116 | 1 | 22 | 0 | 7.4 | 1.0 |
| TWA | 1799 | 1 | 32 | 1.8 | -0.2 | 1264 | 0 | 20 | 0 | 7.8 | 1.4 |
| UAL | 1914 | 1 | 13 | 1.9 | -0.2 | 1702 | 0 | 7 | 0 | 6.1 | 0.7 |
| UNS | 82 | 0 | 50 | 1.4 | 0.6 | 82 | 0 | 50 | 0 | 5.2 | 0.5 |
| UPS | 311 | 2 | 35 | 1.9 | 0.0 | 266 | 0 | 29 | 0 | 9.2 | 1.2 |
| USA | 306 | 1 | 31 | 1.9 | 0.0 | 218 | 0 | 64 | 0 | 8.5 | 1.2 |
| VIR | 392 | 2 | 17 | 1.9 | -0.3 | 339 | 0 | 9 | 0 | 7.5 | 1.0 |
| VKG | 45 | 0 | 2 | 1.4 | 0.1 | 45 | 0 | 2 | 0 | 6.4 | 0.5 |
| BA | 7018 | 1 | 1 | 1.2 | 0.2 | 7016 | 0 | 4 | 0 | 5.6 | 0.9 |
| KL | 3132 | 0 | 0 | 1.6 | 1.1 | 3132 | 0 | 0 | 0 | 5.4 | 0.9 |
| LH | 403 | 0 | 0 | 1.3 | 0.5 | 404 | 0 | 1 | 0 | 5.3 | 0.8 |
| N | 488 | 3 | 18 | 2.5 | 0.5 | 444 | 0 | 8 | 0 | 7.0 | 0.8 |
| ADS | 40 | 0 | 3 | 0.5 | -0.1 | 40 | 0 | 3 | 0 | 3.0 | 0.1 |
| US ACARS | 14496 | 0 | 1 | 1.3 | 0.2 | 14495 | 0 | 3 | 0 | 5.8 | 0.7 |

## TABLE 10

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from Bracknell global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :100 hPa. |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT in metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.1

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | SD | RMS | BIAS |
|---|---|---|---|---|---|---|---|---|
| DBBH | 00 | Z | 100 | 1 | 0 | 0.0 | 55.0 | 55.0 |
| DBBH | 12 | Z | 100 | 1 | 0 | 0.0 | 0.0 | 0.0 |
| ELML7 | 00 | Z | 100 | 15 | 0 | 11.1 | 13.7 | 8.0 |
| ELML7 | 12 | Z | 100 | 13 | 0 | 13.2 | 18.3 | 12.6 |
| FNOR | 00 | Z | 100 | 14 | 0 | 16.2 | 18.9 | 9.6 |
| FNOR | 12 | Z | 100 | 14 | 0 | 18.0 | 19.5 | 7.5 |
| FNOU | 00 | Z | 100 | 13 | 0 | 10.2 | 19.0 | 16.1 |
| FNOU | 12 | Z | 100 | 12 | 0 | 13.4 | 17.4 | 11.1 |
| FNPH | 00 | Z | 100 | 11 | 0 | 14.3 | 17.6 | 10.2 |
| FNPH | 12 | Z | 100 | 12 | 0 | 13.0 | 13.7 | 4.3 |
| FNRS | 00 | Z | 100 | 10 | 0 | 17.4 | 17.5 | 1.3 |
| FNRS | 12 | Z | 100 | 11 | 0 | 16.3 | 16.6 | 3.2 |
| JBOA | 00 | Z | 100 | 1 | 0 | 0.0 | 34.0 | 34.0 |
| JGQH | 00 | Z | 100 | 1 | 0 | 0.0 | 15.0 | 15.0 |
| LDWR | 00 | Z | 100 | 30 | 0 | 11.0 | 14.2 | 8.9 |
| LDWR | 12 | Z | 100 | 27 | 0 | 12.8 | 12.8 | -0.8 |
| OVYA2 | 00 | Z | 100 | 15 | 0 | 15.2 | 15.4 | 2.0 |
| OVYA2 | 12 | Z | 100 | 10 | 0 | 17.7 | 19.2 | 7.3 |
| OXYH2 | 00 | Z | 100 | 9 | 0 | 13.2 | 22.7 | -18.4 |
| OXYH2 | 12 | Z | 100 | 11 | 0 | 20.4 | 21.1 | -5.4 |
| THNOG | 00 | Z | 100 | 1 | 0 | 0.0 | 75.0 | 75.0 |
| UCKZ | 00 | Z | 100 | 1 | 0 | 0.0 | 2.0 | -2.0 |
| V2XM | 00 | Z | 100 | 10 | 0 | 24.9 | 25.6 | 6.2 |
| V2XM | 12 | Z | 100 | 10 | 0 | 44.0 | 45.0 | -9.7 |
| WTEC | 00 | Z | 100 | 7 | 0 | 100.7 | 100.7 | -1.4 |
| WTEC | 12 | Z | 100 | 9 | 0 | 16.5 | 19.7 | 10.7 |
| XXBA | 12 | Z | 100 | 3 | 0 | 24.0 | 44.7 | 37.7 |
| 03953 | 00 | Z | 100 | 28 | 0 | 13.0 | 26.3 | 22.9 |
| 03953 | 12 | Z | 100 | 30 | 0 | 10.0 | 12.9 | 8.2 |
| 04018 | 00 | Z | 100 | 25 | 0 | 14.5 | 14.6 | 1.1 |
| 04018 | 12 | Z | 100 | 22 | 0 | 21.8 | 22.0 | 3.2 |
| 04220 | 00 | Z | 100 | 7 | 0 | 15.4 | 21.6 | 15.1 |
| 04220 | 12 | Z | 100 | 7 | 0 | 5.8 | 17.7 | 16.7 |
| 04270 | 00 | Z | 100 | 30 | 0 | 13.0 | 13.2 | -2.5 |
| 04270 | 12 | Z | 100 | 29 | 0 | 11.0 | 12.9 | -6.6 |
| 04339 | 00 | Z | 100 | 26 | 0 | 11.5 | 17.9 | 13.7 |
| 04339 | 12 | Z | 100 | 18 | 0 | 16.7 | 21.4 | 13.4 |
| 04360 | 00 | Z | 100 | 29 | 0 | 8.8 | 12.0 | 8.1 |
| 04360 | 12 | Z | 100 | 28 | 0 | 16.3 | 20.3 | 12.1 |
| 08001 | 00 | Z | 100 | 22 | 0 | 15.9 | 17.8 | 7.9 |
| 08001 | 12 | Z | 100 | 23 | 0 | 13.9 | 16.8 | -9.5 |
| 08508 | 00 | Z | 100 | 1 | 0 | 0.0 | 11.0 | -11.0 |
| 08508 | 12 | Z | 100 | 19 | 0 | 11.6 | 11.9 | -2.7 |
| 60020 | 00 | Z | 100 | 30 | 0 | 8.9 | 9.4 | 2.9 |
| 60020 | 12 | Z | 100 | 26 | 0 | 0.0 | 0.0 | 0.0 |
| 71600 | 00 | Z | 100 | 30 | 0 | 11.1 | 28.1 | 25.9 |
| 71600 | 12 | Z | 100 | 30 | 0 | 12.2 | 22.9 | 19.4 |
| 72201 | 00 | Z | 100 | 26 | 1 | 21.3 | 35.6 | 28.5 |
| 72201 | 12 | Z | 100 | 28 | 0 | 24.4 | 44.9 | 37.7 |
| 72402 | 00 | Z | 100 | 29 | 1 | 16.3 | 39.1 | 35.5 |
| 72402 | 12 | Z | 100 | 30 | 0 | 12.6 | 48.6 | 46.9 |
| 74494 | 00 | Z | 100 | 25 | 0 | 25.3 | 25.3 | -0.8 |
| 74494 | 12 | Z | 100 | 26 | 0 | 21.9 | 56.5 | 52.1 |
| 78016 | 00 | Z | 100 | 1 | 0 | 0.0 | 23.0 | 23.0 |
| 78016 | 12 | Z | 100 | 27 | 0 | 14.7 | 17.2 | 8.9 |

## TABLE 11

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures:**

**Period** :One calendar month.

**Data monitored** :Reports from selected radiosonde TEMPs.

**Area monitored** :0°N - 90°N, 100°W - 40°E

**Standard of comparison** :Background field from Bracknell global model.

**Position** :Average latitude and longitude for period.

**Observation times** :00, 12 UTC.

**Level monitored** :500 hPa.

**Element monitored** :GEOPOTENTIAL HEIGHT in metres

**Parameters monitored** :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

**GROSS ERROR LIMITS** :Defined in Appendix I.1

```
 WMO   OBS                NUM    NUM
IDENT  TIME  ELM   LEV    OBS   GROSS     SD     RMS    BIAS

DBBH    00    Z    500     1      0      0.0    23.0    23.0
DBBH    12    Z    500     1      0      0.0     0.0     0.0
ELML7   00    Z    500    18      0      9.0    14.9    11.8
ELML7   12    Z    500    15      0      8.9    14.1    10.9
FNOR    00    Z    500    16      0     11.1    19.5    16.0

FNOR    12    Z    500    18      0     14.5    17.8    10.3
FNOU    00    Z    500    13      0      5.2    22.1    21.5
FNOU    12    Z    500    12      0     12.1    27.5    24.7
FNPH    00    Z    500    11      0     11.8    18.8    14.6
FNPH    12    Z    500    12      0      5.5    13.3    12.2

FNRS    00    Z    500    12      0     13.1    15.8     8.8
FNRS    12    Z    500    11      0     13.2    17.4    11.4
JBOA    00    Z    500     1      0      0.0     7.0     7.0
JGQH    00    Z    500     1      0      0.0    12.0    12.0
LDWR    00    Z    500    31      0     12.7    14.9     7.9

LDWR    12    Z    500    28      0     10.7    10.8     1.2
OVYA2   00    Z    500    16      0     12.5    13.7    -5.8
OVYA2   12    Z    500    12      0      8.8    15.1   -12.3
OXYH2   00    Z    500     9      0     14.8    20.0   -13.3
OXYH2   12    Z    500    11      0     17.6    25.5   -18.4

THNOG   00    Z    500     1      0      0.0    36.0    36.0
UCKZ    00    Z    500     1      0      0.0    11.0   -11.0
V2XM    00    Z    500    10      0     12.9    15.0     7.8
V2XM    12    Z    500     9      1     33.4    34.1    -6.9
WTEC    00    Z    500    14      0     30.2    32.0    10.7

WTEC    12    Z    500    13      0     20.2    27.6    18.8
XXBA    12    Z    500     6      0     13.2    16.6    10.2
03953   00    Z    500    31      0     12.1    20.4    16.4
03953   12    Z    500    30      0      8.0    10.8     7.3
04018   00    Z    500    31      0      9.7    13.1     8.9

04018   12    Z    500    30      0     12.7    13.1     3.2
04220   00    Z    500    31      0     17.3    19.1     8.2
04220   12    Z    500    29      0     14.6    14.9     3.2
04270   00    Z    500    31      0     14.9    15.9    -5.4
04270   12    Z    500    29      0     12.6    14.6    -7.4

04339   00    Z    500    31      0      7.8    11.7     8.7
04339   12    Z    500    28      0     11.2    12.5     5.5
04360   00    Z    500    30      0     10.1    10.9     4.1
04360   12    Z    500    28      0      7.3     7.3     0.3
08001   00    Z    500    29      0     12.8    15.9     9.6

08001   12    Z    500    30      0      9.6     9.7    -1.1
08508   00    Z    500     1      0      0.0     5.0    -5.0
08508   12    Z    500    26      0      8.0    12.6     9.8
60020   00    Z    500    30      0     12.7    22.6    18.7
60020   12    Z    500    27      0      9.6    14.9    11.3

71600   00    Z    500    30      0      9.2    14.8    11.5
71600   12    Z    500    30      0      8.3    16.8    14.5
72201   00    Z    500    28      0      8.5    15.7    13.2
72201   12    Z    500    28      0     11.6    17.7    13.4
72402   00    Z    500    30      0     16.9    17.1    -2.5

72402   12    Z    500    30      0     12.0    13.5     6.2
74494   00    Z    500    31      0     11.4    11.8     3.0
74494   12    Z    500    29      0     12.1    13.5     6.0
78016   00    Z    500     1      0      0.0    13.0    13.0
78016   12    Z    500    28      0     10.1    21.9    19.4
```

## TABLE 12

# MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from Bracknell global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :100 hPa. |
| **Element monitored** | | :VECTOR WIND in m $s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS | :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.2

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | % REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| DBBH | 00 | V | 100 | 1 | 0 | 0 | 0.0 | -0.8 | 1.0 |
| DBBH | 12 | V | 100 | 1 | 0 | 0 | 0.0 | 2.5 | -1.1 |
| ELML7 | 00 | V | 100 | 14 | 0 | 0 | 5.1 | 0.3 | 1.1 |
| ELML7 | 12 | V | 100 | 11 | 0 | 0 | 2.7 | -0.2 | -0.8 |
| FNOR | 00 | V | 100 | 10 | 0 | 10 | 3.5 | -1.9 | 0.5 |
| FNOR | 12 | V | 100 | 14 | 0 | 0 | 3.4 | 0.9 | 1.3 |
| FNOU | 00 | V | 100 | 12 | 0 | 0 | 3.9 | -1.5 | -1.2 |
| FNOU | 12 | V | 100 | 9 | 0 | 0 | 4.0 | 0.5 | 0.4 |
| FNPH | 00 | V | 100 | 9 | 0 | 0 | 4.0 | -0.3 | 0.3 |
| FNPH | 12 | V | 100 | 10 | 0 | 0 | 4.0 | 2.4 | -0.3 |
| FNRS | 00 | V | 100 | 8 | 0 | 0 | 2.9 | -0.7 | 1.3 |
| FNRS | 12 | V | 100 | 9 | 0 | 0 | 2.9 | 1.0 | -0.2 |
| JBOA | 00 | V | 100 | 1 | 0 | 0 | 2.9 | 3.1 | 0.2 |
| JGQH | 00 | V | 100 | 1 | 0 | 0 | 3.5 | 0.0 | -0.6 |
| LDWR | 00 | V | 100 | 30 | 0 | 0 | 3.5 | 0.7 | 0.3 |
| LDWR | 12 | V | 100 | 27 | 0 | 0 | 1.9 | -0.2 | 0.3 |
| OVYA2 | 00 | V | 100 | 14 | 0 | 0 | 1.8 | -1.1 | 0.5 |
| OVYA2 | 12 | V | 100 | 10 | 0 | 0 | 1.1 | -1.0 | 1.3 |
| OXYH2 | 00 | V | 100 | 8 | 0 | 0 | 2.5 | -2.5 | 0.4 |
| OXYH2 | 12 | V | 100 | 9 | 0 | 0 | 2.5 | -0.8 | 1.6 |
| THNOG | 00 | V | 100 | 1 | 0 | 0 | 2.5 | 0.4 | -2.5 |
| V2XM | 00 | V | 100 | 9 | 0 | 0 | 4.6 | -0.5 | 0.1 |
| V2XM | 12 | V | 100 | 10 | 0 | 0 | 4.6 | -0.1 | -0.1 |
| WTEC | 00 | V | 100 | 4 | 0 | 0 | 3.8 | 4.2 | 1.4 |
| WTEC | 12 | V | 100 | 6 | 0 | 0 | 3.8 | -0.1 | -1.5 |
| 03953 | 00 | V | 100 | 28 | 0 | 0 | 1.9 | 0.2 | 0.5 |
| 03953 | 12 | V | 100 | 30 | 0 | 0 | 1.7 | 0.1 | 0.6 |
| 04018 | 00 | V | 100 | 23 | 0 | 0 | 1.7 | -1.0 | -0.1 |
| 04018 | 12 | V | 100 | 21 | 0 | 0 | 2.6 | -1.5 | 0.3 |
| 04220 | 00 | V | 100 | 5 | 0 | 0 | 3.4 | 0.0 | 0.2 |
| 04220 | 12 | V | 100 | 5 | 0 | 0 | 3.4 | -0.7 | -1.8 |
| 04270 | 00 | V | 100 | 29 | 0 | 0 | 3.4 | -0.9 | 1.3 |
| 04270 | 12 | V | 100 | 26 | 0 | 0 | 3.0 | 0.0 | 0.7 |
| 04339 | 00 | V | 100 | 26 | 0 | 3 | 2.3 | 3.1 | -1.7 |
| 04339 | 12 | V | 100 | 18 | 0 | 0 | 5.5 | -0.4 | -0.1 |
| 04360 | 00 | V | 100 | 28 | 1 | 3 | 2.4 | -0.5 | 3.2 |
| 04360 | 12 | V | 100 | 24 | 0 | 0 | 2.3 | -0.3 | 1.1 |
| 08001 | 00 | V | 100 | 21 | 0 | 0 | 5.8 | -0.3 | 0.1 |
| 08001 | 12 | V | 100 | 22 | 0 | 0 | 3.7 | 0.9 | 0.4 |
| 08508 | 00 | V | 100 | 1 | 0 | 0 | 2.9 | -6.6 | 2.3 |
| 08508 | 12 | V | 100 | 14 | 0 | 7 | 2.9 | 1.0 | -0.3 |
| 60020 | 00 | V | 100 | 29 | 0 | 0 | 3.4 | 1.2 | 2.0 |
| 60020 | 12 | V | 100 | 25 | 0 | 0 | 4.3 | 1.1 | -0.4 |
| 71600 | 00 | V | 100 | 30 | 0 | 0 | 2.0 | -0.4 | 0.4 |
| 71600 | 12 | V | 100 | 30 | 0 | 0 | 2.0 | 0.8 | -0.2 |
| 72201 | 00 | V | 100 | 25 | 0 | 4 | 2.6 | -1.2 | -0.1 |
| 72201 | 12 | V | 100 | 27 | 0 | 0 | 5.2 | -0.4 | 0.0 |
| 72402 | 00 | V | 100 | 30 | 0 | 0 | 3.9 | -0.3 | 0.2 |
| 72402 | 12 | V | 100 | 30 | 0 | 0 | 2.6 | -0.8 | 0.4 |
| 74494 | 00 | V | 100 | 25 | 0 | 0 | 2.8 | -0.9 | 1.1 |
| 74494 | 12 | V | 100 | 24 | 0 | 0 | 2.1 | -0.3 | 0.4 |
| 78016 | 00 | V | 100 | 1 | 0 | 0 | 7.4 | 8.6 | -5.8 |
| 78016 | 12 | V | 100 | 27 | 0 | 0 | 7.4 | 0.6 | 1.2 |

## TABLE 13

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: May, 1998

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from Bracknell global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :500 hPa. |
| **Element monitored** | | :VECTOR WIND in $m\ s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS: | Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |

GROSS ERROR LIMITS :Defined in Appendix I.2

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | % REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| DBBH | 00 | V | 500 | 1 | 0 | 0 | 2.8 | 1.8 | -2.3 |
| ELML7 | 00 | V | 500 | 16 | 0 | 0 | 4.5 | 1.1 | 1.4 |
| ELML7 | 12 | V | 500 | 15 | 0 | 0 | 2.9 | 0.5 | 0.2 |
| FNOR | 00 | V | 500 | 14 | 0 | 7 | 2.6 | -1.7 | 0.0 |
| FNOR | 12 | V | 500 | 14 | 0 | 0 | 3.9 | -2.1 | -1.4 |
| FNOU | 00 | V | 500 | 12 | 0 | 0 | 3.7 | 0.3 | 0.1 |
| FNOU | 12 | V | 500 | 11 | 0 | 0 | 3.3 | 0.7 | -0.2 |
| FNPH | 00 | V | 500 | 9 | 0 | 0 | 3.7 | -0.5 | -0.9 |
| FNPH | 12 | V | 500 | 10 | 0 | 0 | 3.7 | -1.3 | -0.5 |
| FNRS | 00 | V | 500 | 8 | 0 | 0 | 2.9 | -1.2 | 3.6 |
| FNRS | 12 | V | 500 | 9 | 0 | 0 | 2.9 | 1.0 | 1.9 |
| JBOA | 00 | V | 500 | 1 | 0 | 0 | 2.9 | 1.0 | -0.1 |
| JGQH | 00 | V | 500 | 1 | 0 | 0 | 2.4 | 0.7 | 0.2 |
| LDWR | 00 | V | 500 | 31 | 0 | 0 | 2.4 | 0.1 | 0.4 |
| LDWR | 12 | V | 500 | 28 | 0 | 0 | 2.7 | 0.4 | -0.3 |
| OVYA2 | 00 | V | 500 | 15 | 0 | 0 | 2.6 | -0.3 | 0.9 |
| OVYA2 | 12 | V | 500 | 11 | 0 | 0 | 4.4 | 0.5 | 0.3 |
| OXYH2 | 00 | V | 500 | 9 | 0 | 0 | 3.5 | -1.0 | -1.0 |
| OXYH2 | 12 | V | 500 | 11 | 0 | 0 | 3.5 | 1.2 | -0.2 |
| THNOG | 00 | V | 500 | 1 | 0 | 0 | 4.4 | -8.6 | 2.3 |
| V2XM | 00 | V | 500 | 9 | 0 | 0 | 4.7 | 0.1 | 2.4 |
| V2XM | 12 | V | 500 | 10 | 0 | 0 | 4.7 | 0.0 | 1.2 |
| WTEC | 00 | V | 500 | 9 | 0 | 0 | 4.8 | -0.5 | -0.8 |
| WTEC | 12 | V | 500 | 8 | 0 | 0 | 4.8 | 0.3 | -2.4 |
| 03953 | 00 | V | 500 | 31 | 0 | 0 | 2.1 | -0.2 | -1.6 |
| 03953 | 12 | V | 500 | 30 | 0 | 0 | 2.9 | 1.5 | -1.5 |
| 04018 | 00 | V | 500 | 27 | 0 | 0 | 2.9 | 0.9 | 0.9 |
| 04018 | 12 | V | 500 | 25 | 0 | 0 | 2.6 | 1.1 | 0.1 |
| 04220 | 00 | V | 500 | 27 | 0 | 0 | 3.4 | -0.1 | -0.9 |
| 04220 | 12 | V | 500 | 27 | 0 | 0 | 3.3 | -0.5 | -1.1 |
| 04270 | 00 | V | 500 | 31 | 0 | 0 | 4.1 | -0.8 | -1.2 |
| 04270 | 12 | V | 500 | 27 | 0 | 0 | 3.9 | 0.1 | -0.1 |
| 04339 | 00 | V | 500 | 30 | 0 | 0 | 3.6 | 0.1 | -1.1 |
| 04339 | 12 | V | 500 | 28 | 0 | 3 | 4.8 | 1.3 | -1.4 |
| 04360 | 00 | V | 500 | 29 | 0 | 0 | 5.9 | -0.3 | 0.1 |
| 04360 | 12 | V | 500 | 27 | 0 | 0 | 3.1 | -0.5 | 0.2 |
| 08001 | 00 | V | 500 | 28 | 0 | 0 | 3.4 | 0.2 | 0.2 |
| 08001 | 12 | V | 500 | 29 | 0 | 0 | 3.9 | -0.1 | -1.5 |
| 08508 | 00 | V | 500 | 1 | 0 | 0 | 4.0 | -1.6 | -1.0 |
| 08508 | 12 | V | 500 | 22 | 0 | 4 | 4.0 | 0.9 | 0.3 |
| 60020 | 00 | V | 500 | 30 | 0 | 0 | 2.7 | -0.7 | -0.6 |
| 60020 | 12 | V | 500 | 27 | 0 | 0 | 2.5 | -0.3 | 0.5 |
| 71600 | 00 | V | 500 | 30 | 0 | 0 | 2.6 | 1.4 | 0.3 |
| 71600 | 12 | V | 500 | 30 | 0 | 0 | 2.5 | 1.0 | 0.4 |
| 72201 | 00 | V | 500 | 28 | 0 | 0 | 4.0 | 0.8 | -1.6 |
| 72201 | 12 | V | 500 | 28 | 0 | 0 | 4.2 | 0.4 | -0.7 |
| 72402 | 00 | V | 500 | 30 | 0 | 0 | 2.5 | 0.7 | 0.5 |
| 72402 | 12 | V | 500 | 30 | 0 | 0 | 2.8 | 0.6 | 0.7 |
| 74494 | 00 | V | 500 | 31 | 0 | 0 | 3.3 | 0.4 | 0.5 |
| 74494 | 12 | V | 500 | 29 | 0 | 0 | 2.1 | 1.0 | 1.4 |
| 78016 | 00 | V | 500 | 1 | 0 | 0 | 4.1 | 1.3 | -2.2 |
| 78016 | 12 | V | 500 | 28 | 0 | 0 | 4.1 | 1.2 | 0.7 |

# APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

| Level (hPa) | Geopotential height (metres) |
|---|---|
| 1000 | 100 |
| 850 | 100 |
| 700 | 100 |
| 500 | 150 |
| 400 | 175 |
| 300 | 200 |
| 250 | 225 |
| 200 | 250 |
| 150 | 275 |
| 100 | 300 |
| 70 | 375 |
| 50 | 400 |
| 30 | 450 |

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

| Level (hPa) | Weight |
|---|---|
| 1000 | 3.70 |
| 850 | 3.40 |
| 700 | 2.90 |
| 500 | 2.20 |
| 400 | 1.90 |
| 300 | 1.60 |
| 250 | 1.50 |
| 200 | 1.37 |
| 150 | 1.19 |
| 100 | 1.00 |
| 70 | 0.87 |
| 50 | 0.80 |
| 30 | 0.64 |

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

| Level (hPa) | Windspeed m $s^{-1}$ |
|---|---|
| 1000 | 35 |
| 850 | 35 |
| 700 | 40 |
| 500 | 45 |
| 400 | 50 |
| 300 | 60 |
| 250 | 60 |
| 200 | 50 |
| 150 | 50 |
| 100 | 45 |